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Paper TRADE JOURNAL
REG. U. S. PAT. OFF.

VOLUME 126, No. 13 MARCH 25, 1948

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ROBERT BURNS

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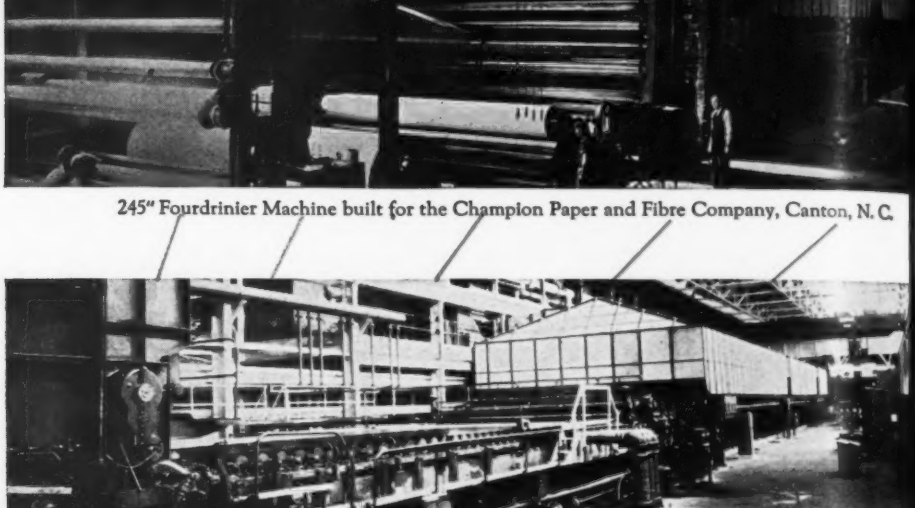
CALENDAR OF COMING EVENTS

May 19, 20, 21, 1948—American Pulp and Paper Mill Superintendents Association, Annual Meeting, Roosevelt Hotel, New Orleans, La.

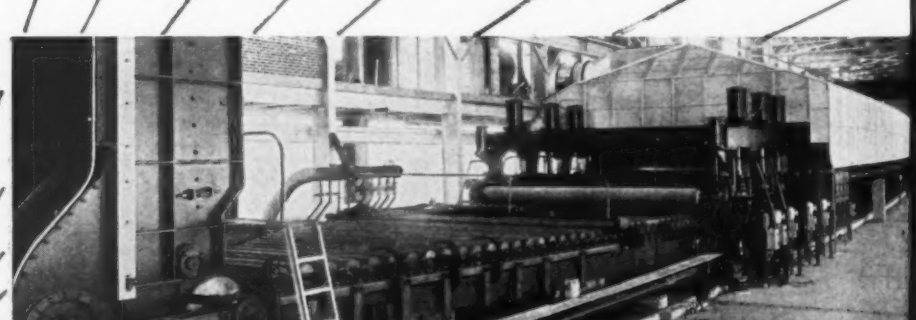
June 11-12, 1948—Paper & Twine Association, Annual Convention, French Lick Springs, Indiana.

April 5-7—National Paper Trade Association, Annual Convention, The Waldorf-Astoria, New York City.

May 9-12—National Paper Box Manufacturers Association, Annual Convention, Cincinnati, O.

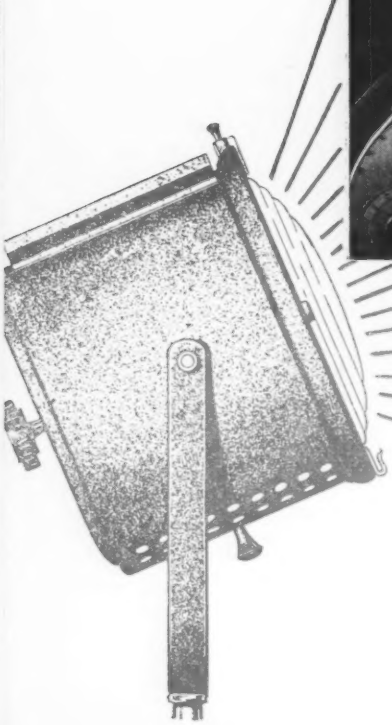


245" Fourdrinier Machine built for the Champion Paper and Fibre Company, Canton, N. C.



236" Fourdrinier Machine built for Union Bag & Paper Corporation, Savannah, Ga.

234" Fourdrinier Machine built for Hudson Paper Company, Palatka, Fla.



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Paper TRADE JOURNAL

VOL. 126, NO. 13 REG. U.S. PAT. OFF. MARCH 25, 1948

ANPA Members Report Inventories Lower

NEW YORK—Stocks of newsprint on hand and in transit at the end of February 1948 dropped sharply to 34 days supply for daily newspapers reporting to the American Newspaper Publishers Association. This represents a decrease of seven days supply compared with stocks on hand at the end of the preceding month. Stocks of 34 days at the end of February 1948 compare with 32 days at the end of February 1947; 35 days at the end of February 1946 and 50 days at the end of February 1945. Stocks on hand and in transit include a considerable amount of tonnage brought in by water in the summer, use of which by some newspapers is spread through the winter months.

Daily newspapers reporting to the ANPA consumed 307,967 tons of newsprint in February 1948 compared with 258,424 tons in February 1947 and 223,244 tons in February 1946. This was an increase in February 1948 over February 1947 of 19.2% and an increase over February 1946 of 38.0%.

The total estimated newsprint consumption in the United States for February 1948 was 402,571 tons which includes all kinds of uses of newsprint. For the first two months of 1948 it is estimated to be 784,969 tons. During the first two months of 1948 the reporting newspapers used 600,501 tons of newsprint, an increase of 14.4% over the first two months of 1947 and an increase of 35.2% over the first two months of 1946.

Wisconsin Chemists Discuss Research Management

APPLETON, Wis. — A symposium on "Research Management" was held March 16 by the Northwestern Wisconsin section of the American Chemical Society after a dinner meeting. The four panel speakers and their subjects were C. B. Sitteron, Jr., assistant secretary of the Institute of Paper Chemistry, "Personnel Selection"; Nelson E. Rodgers, research manager at Western Condensing Company, "Problem Assignment and Solution"; Donald W. Davis, director of research for United States operations, Marathon Corporation, "Reporting," and J. B. Catlin, assistant technical director, Kimberly-Clark Corporation, "Financing."

New England Awaits Senate's Action on Flood Control Bills

Marinette County Would Withdraw Forest Crop Law

MARINETTE, Wis. — The Marinette county board of supervisors last week considered a resolution by the town board of Athelstane for the withdrawal of land from the forest crop area. The resolution was referred to the land committee.

Louis Ness, chairman of the land committee, said he wondered what the reaction of the state would be after paying the town for the use of the land and getting the town on its feet, and then having the land withdrawn. "They have planted acres and acres. Would it be the fair thing to do, after this has been done, to ask the state for its return? I doubt it," he said.

Several other board members expressed themselves as opposed to the withdrawal. It was also felt that the request should have been sent to the state instead of the county board.

Forest Products Industries Expands News Staff

WASHINGTON—William Ronald Richardson, former Washington newspaperman, on March 1 became editorial assistant to W. F. Jibb, editor, American Forest Products Industries. A native of the State of Washington, Richardson received his formal education in Goldendale, Wash., and his journalism degree from the University of Washington in 1936.

Ewing Mill Takes Over Town Barn Property

ORANGE, Mass.—Sale of the so-called town barn property at the corner of South Main and East River Streets to the Erving Paper Mill for $18,000 has been made by town officials. The sale was authorized at a special town meeting last July.

The property, originally the printing plant and store room of the old New Home Sewing Machine Co., was purchased by the town in 1933 from the Westinghouse Electric Co. It has been leased to the Erving Paper Mills since 1941, and it is a converting plant for toilet paper and paper towels.

SPRINGFIELD, Mass. — Flood-conscious paper manufacturers throughout this area have learned that the Senate Appropriations Committee will decide soon whether to appropriate funds to begin construction of Barre Falls reservoir on the Ware River during the fiscal year which begins July 1.

Senator Leverett Saltonstall and Rep. Charles R. Clason have appealed to the Senate committee to appropriate $754,000 to start work this year on the important link of the over-all flood control development of the Connecticut River.

Although Army engineers have recommended construction of the Barre Falls dam and $120,000 has been spent to date in planning it, the Budget Bureau turned thumbs down on the project receiving funds during the new fiscal year, and the prudent House Appropriations Committee followed suit by omitting appropriations for it.

If the Senate Appropriations Committee votes $754,000 for the Barre Falls dam, a House-Senate conference committee will have to decide whether to leave it in the law. As a general rule, the conference committee permits additions made by the more generous Senate to remain.

The House did approve funds for five Connecticut River projects and approval by the Senate, also, is virtually assured. The projects and the funds granted for the next fiscal year by the House are as follows:—

Union Village, Vt., $1,200,000, plus $60,000 left over from the current fiscal year; Birch Hill Reservoir, $100,000; Holyoke, $755,000, plus $61,000 left over from the current fiscal year; Springdale, $315,000, plus $25,000 left over, and Chicopee, $110,000.

The House also approved $20,000 to be used for planning future Connecticut River flood control development.

Representative Clason pointed out that the federal government has already spent $40,000,000 on flood control development of the Connecticut River. When the program is completed, it is estimated that the overall project will have cost a grand total of $93,000,000, although if present

(Continued on page 24)

Combined Locks Adds To Its Capacity

APPLETON, Wis. — The Combined Locks Paper Company, Combined Locks, Wis., is spending $1,750,000 on new construction, new machinery and equipment and in remodeling, according to G. D. Muggleton, vice-president and general manager. The company, now a part of Cuneo Press, Chicago, has added machine coated book paper to its products.

Production is about fifty percent higher than a year ago, the added output going into the manufacture of the book paper for quality magazines. The company has always made lightweight printing papers, suitable for mail order catalogues, directories, telephone books, etc., and this production will continue.

The company is constructing a huge building which will be used as a warehouse but which is of mill-type construction and can be converted later if the company decides that it is necessary, Mr. Muggleton said. The new building is 72 feet wide, 375 feet long and two stories high. It has been in process of construction for some months, and is expected to be in use within 60 days. It is of concreted and steel with conventional factory-type windows. Two warehouses at Kaukauna will be abandoned when the new building is ready.

An office building is in the planning stage and probably will be erected next summer. The present offices are adjacent to the machine room, and when the new offices have been completed the machine room will have about 30 by 100 feet of additional space.

Under construction at present is an addition to the machine room about 200 feet in width. This addition will make the room 15 feet wider and will extend out over the tailrace, two stories high.

A new paper machine will replace an old one now producing machine coated book paper. It will increase production about 6,000 tons a year, Mr. Muggleton estimates. It will turn out a sheet 120 inches wide at higher speed. Two other paper machines are turning out the higher grade paper.

The company spent a large sum of money in its pulp plant, reconditioning machinery and equipment and increasing capacity, in order to make machine coated book paper. The power plant was improved about four years ago.

The company spent about $200,000 in the finishing room, including about $125,000 for a new super calender, Mr. Muggleton said. A new sheeter was purchased and other equipment in the finishing room was reconditioned. Paper machines also have been improved.

In addition to the other types of printing papers, the company makes a strong food wrapping paper which will take printing. Production of all types averages about 175 tons a day or between 50,000 and 55,000 tons per year.

Personnel has been increased in the last two years from about 350 employes to 480, and when the expansion program has been completed it may go higher, Mr. Muggleton asserted.

Alabama Produces Its First Run of Kraft

PENSACOLA, Fla. — The newly-constructed kraft paper mill of the Alabama Pulp & Paper Company here, a wholly-owned subsidiary of the St. Regis Paper Company, produced its first paper late last week, according to James H. Allen, president of the Alabama company and a director of St. Regis.

Specially designed and equipped for the manufacture of special, heavy-duty multiwall kraft paper, the Alabama mill, with a rated capacity of 250 tons a day, has been built on a site adjacent to the company's Florida Pulp & Paper mill and will supply kraft paper to the new multiwall bag plant now ready to go into production, as well as to the firm's other multiwall plants.

Near the source of its permanent fast-growing wood supply, the new, low-cost, economic unit helps complete the company's integrated kraft operations at Pensacola, from trees to pulp to paper to multiwall bags.

New One-Year Contract Ends Hammermill Strike

ERIE, Pa.—A one-year contract between the Hammermill Paper Company and Local 12560, United Mine Workers of America, has been signed following the ending March 13th of a 13-day strike at the eastside plant. Peter MacCagno, field representative of the union, declared, "everything is all right," and added he had no statement.

Both Mr. MacCagno and company representatives reported the 1,495 striking employes had begun returning to work. The work stoppage ended with acceptance by the union of an across-the-board 11-cent hourly wage increase as proposed by the company. Women in the lowest brackets will receive an additional boost of two cents an hour.

The new hourly scale will be $1.05 for men and 94 cents for women.

Gould Base Rate Set at $1.05

LYONS FALLS, N. Y. — Roy W. Shaver, vice-president and general manager of Gould Paper Company, declared this week that the company had given an eight percent general wage increase effective March 1. This increase makes the company's base rate $1.05 per hour. It is the fifth wage increase since V-J Day and, Mr. Shaver said that total increases to employes amount to 50 cents per hour.

Niagara Falls Sees IPCo. Job Near Done

NIAGARA FALLS, N. Y.—Work on the plant-improvement and new construction program of the Niagara Falls plant of the International Paper Company is now in its advanced stages, H. P. Bailey, general manager of the plant, reported this week.

Already installed, according to Bailey, are save-alls which remove fibre from water before final disposal and hydrapulpers, which break up paper stock. One of the hydrapulpers is already in operation, and two additional ones are expected to be in operation in the very near future, Bailey said.

Approximately $1,250,000 was allotted to the local plant by the company, when President John H. Hinman announced a $25 million construction program for the entire International Paper Company system for this year. Biggest item of local construction, a steam boiler plant, is expected to be in operation in about a month, Bailey said. A new pulp handling system will probably be in operation about April 1, it was added.

The construction program is expected to result in increased production eventually, but not immediately. Further improvements of a similar magnitude are contemplated locally for 1949, it is understood.

Bemis Buys Plant Site Near Wilmington, Del.

WILMINGTON, Del.—Bemis Bro. Bag Company has purchased a 27-acre industrial site near Wilmington for the construction of a paper bag manufacturing plant, it was made known this week by Bemis Vice-President H. H. Allen, New York. The property is about three miles southwest of the Wilmington city limits and on the main Philadelphia-Washington line of the Pennsylvania railroad.

The plant wil be built from plans developed by the Bemis company incorporating the most up-to-date features of bag factory design. The initial building unit will be 160 x 460 feet. This will be the twenty-eighth Bemis plant and the seventh one in which multiwall paper shipping sacks are manufactured.

Mohawk Appoints Reynolds In Philadelphia

COHOES, N. Y. — Mohawk Paper Mills, Inc., has appointed Ira S. Reynolds as manager of its Philadelphia office. Mr. Reynolds comes to Mohawk after serving in Washington, D. C., as paper consultant with the OPA, OCR and WAA. Prior to his government service, he was, for a number of years, Philadelphia representative for the St. Regis Paper Company.

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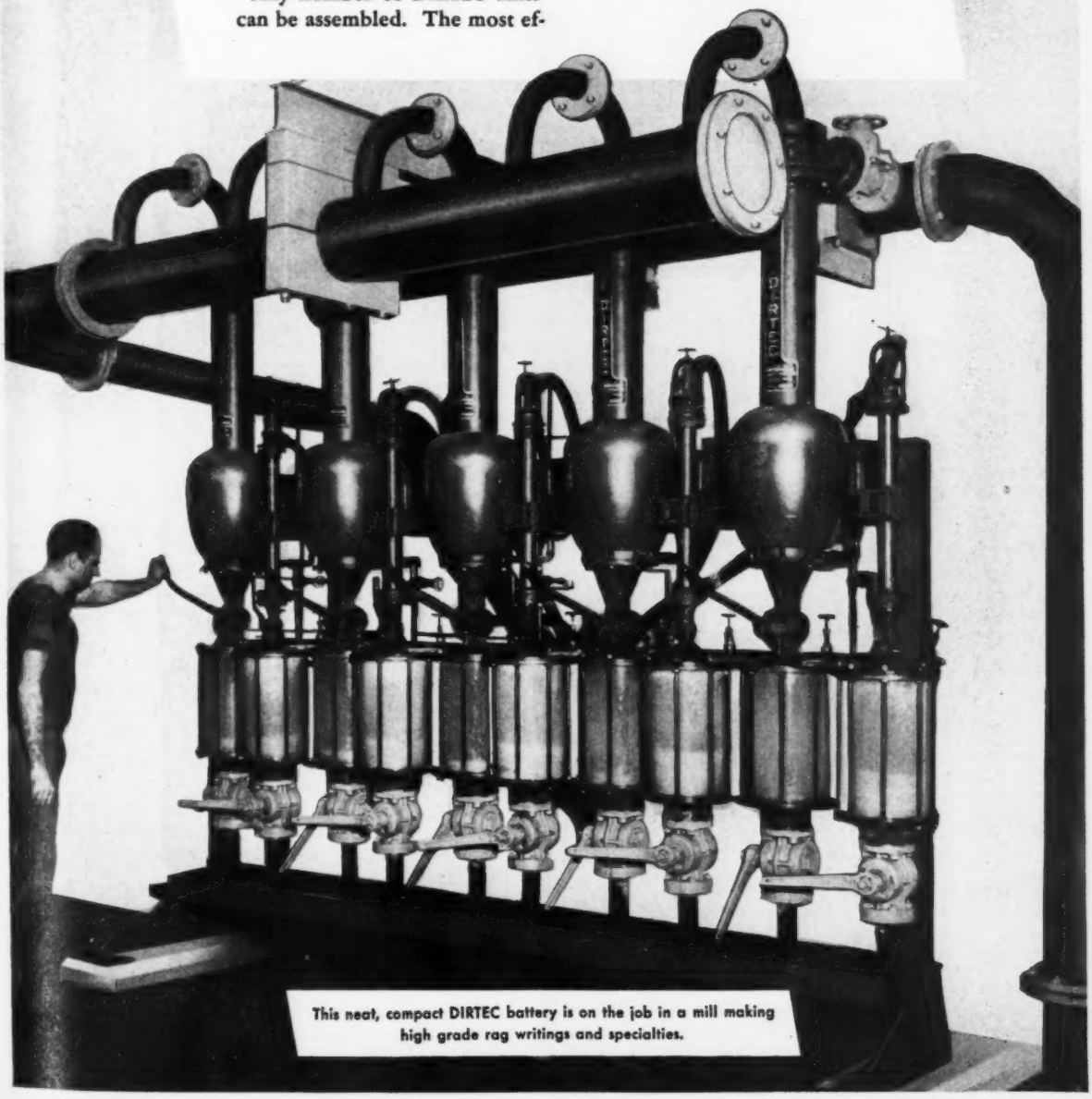

This neat, compact DIRTEC battery is on the job in a mill making high grade rag writings and specialties.

Professional Group Sponsors Programs

CHICAGO—The Professional Paper Group came into its own this week as the sponsor of two of the many fine panel discussions which featured the annual Production Show at the Hotel Stevens. An estimated 25,000 to 30,000 technicians and professionally trained executives met on March 22, 23 and 24 to participate in the largest conference of its kind ever held. Members of fifty-two professional societies, including the Chicago Paper Group, met the public face-to-face in a "Progress Report to the Nation" which featured exhibits, demonstrations and non-technical talks of the miracles coming out of laboratories, factories and research institutions.

The Chicago Professional Paper Group, only a fledgling in organization experience, and just a year away from designation as the TAPPI representative in this area, sponsored the panels on "Packages for John Q Public" and "Color In Printing-Its Psychology" which, while only two among many, attracted widespread attention and an excellent attendance.

The first of these panels, on packaging, was held the morning of March 23, with Irving J. Stoller, Fibleco Illinois Paper Corporation, as honorary chairman and H. R. Allwy, Chicago Show Printing Company a panel chairman. Actual panel discussions were prefaced by a short statement given by J. L. Kubicka, Container Corporation of America and President of the Chicago Section of TAPPI (Chicago Professional Paper Group), who outlined the importance of the panels, the interest exhibited by them among his own members and invited those in attendance to enjoy the monthly meeting of the Group held on March 23.

He was followed by Harry Weston, who recently joined the American Pulp and Paper Mill Superintendent's Association, as an executive. He discussed Chicago TAPPI activities, reviewed the well rounded monthly programs, indicated the importance of panel discussions to the Chicago group, and in general, set the stage for the discussions which followed.

The chairman outlined the need for technical emphasis in the field of industrial packaging to reduce costs and losses. From a wide background of experience in the paper and packaging industry, he pointed out the importance of more public interest in sound packaging as a necessary adjunct to the programs of the shippers themselves. Mr. Stoller was followed by Charles L. Barr, vice-president of F. B. Redington Company, who outlined the size and scope of the packaging industry and stressed the importance of mechanization in the packaging industry, importance to both the industry and the public, and left the impression that the packaging field was virtually untouched in relation to its vast potentialities.

"Control of Good Package Design" was the subject discussed by Albert Kner, manager of design laboratories of the Container Corporation of America. Known for his ability to create competitive and useful packages through expert use of color and design, Mr. Kner presented some twenty charts showing the physological and optical illusions and effects obtained through the use of assorted colors, designs and shapes.

The last speaker on the panel program, J. L. Ware of Sears Roebuck & Company, did a good job of showing that good packaging was good insurance and stressed the importance of public reaction to the packaging job done.

St. Lawrence Reorganization Again Turned Back

MONTREAL—The St. Lawrence Corporation, Ltd., late last week was turned back in its effort to have its reorganization plan reinstated.

Judge Alfred Duranleau in Superior Court dismissed the corporation's petition for a writ of certiorari as a means to obtain annulment of an order by Judge Louis Boyer which rejected the reorganization proposal.

Judge Duranleau held that the corporation "failed to show a prima facie case" for the issuance of the writ.

Judge Boyer rejected the reorganization plan on January 27 as the result of a petition filed by Joseph Mayr, New York securities dealer. He ruled that the stockholders were given misleading and insufficient information on which to base their votes at the shareholders' meetings. He also said the plan was "unfair" and "in the sole interest of the common stockholders."

The plan of recapitalization was initially approved by shareholders and ratified on December 22, 1947, by the court.

Northern Mills Suffers Second Fire Outbreak

GREEN BAY, Wis.—Firemen again were called out on March 17 to battle a stubborn blaze in the chip bin of the Northern Paper Mills Company. It was the second fire at Northern in less than three weeks. Workmen preparing to charge one of the digesters reported a "ball of fire" coming out of the No. 2 bin. Firemen were unable to determine the origin, since the mass of burning chips was near the bottom and against one side of the hopper at the base of the bin, from which the chips are fed into the digesters. The blaze spread to the planking of the adjoining No. 1 hopper, which was full of chips.

Internal sprinklers, hoses and steam were used to wet down the chips in both bins, and those from No. 2 were dumped into the digesters. The loss was covered by insurance.

TAPPI Tacoma Meet Talks Engineering

TACOMA, Wash.—About one hundred fifty members and guests of the Pacific Section of the Technical Association of the Pulp and Paper Industry met here March 9, for the annual engineering meeting of the Section. The Tacoma hosts, the St. Regis Paper Company and the Pennsylvania Salt Manufacturing Co. of Washington provided excellent physical arrangements for the meeting at the "Top of the Ocean," Old Town, Tacoma.

The meeting convened at 2:00 p.m. when Chairman J. L. McCarthy introduced C. R. McCully, Pulp Division, Weyerhaeuser Timber Company, Longview. Dr. McCully presented a paper in competition for the Shibley Award "The Determination of Metals in Pulp by the Use of the Dropping Mercury Electrode." This paper describes the apparatus and technique employed in a quick and acurate method for determining metals in pulp and was well received by the group.

The chairman next introduced J. H. McCarthy of the St. Regis Paper Company, Tacoma who served as moderator for the Engineering Panel discussion which followed.

Dr. Frank West of the Chemical Engineering Department, University of Washington presented a paper on "The Chemical Engineering Aspects of Drying" in which he developed in an interesting manner the general theories of drying.

Virgil Peters, Engineering Department, Longview Fibre Company, spoke on "The Engineering Department's Activities in Maintenance." His remarks on engineering problems in maintenance produced many questions and considerable discussion from the audience.

William Pittam, Pulp Division, Weyerhaeuser Timber Company, and Leonidas E. Hill of the Everett mill discussed "The Engineering Department's Activities in Plant Operations" and "The Engineering of New Equipment in an Existing Plant" in an interesting and an oftentimes highly humorous manner.

The meeting concluded with a paper by M. K. Hecker, Barthel Chemical Construction Co., Tacoma "Corrosion and Abrasion Resistant Linings and Materials."

After a 6:00 p.m. social hour, dinner was served to one hundred forty members and guests and followed by the showing of films through the courtesy of the American Cyanamid & Chemical Corp. and the Allis-Chalmers Mfg. Co.

The next meeting of Pacific Section will be the Annual Joint Meeting with the Pacific Coast Division, American Pulp & Paper Mill Superintendents Association. This meeting, to be held at Gearhart, Oregon, May 6, 7, 8, 1948, is expected to be well-attended.

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TAPPI Ohio Section Discusses Packaging

MIDDLETON—Modern packaging was the subject of the Ohio Section meeting of TAPPI at the Hotel Manchester on March 11. Following a dinner enjoyed by forty-nine members and guests and a brief business meeting, the speaker of the evening, C. A. Southwick, Jr., was presented by E. B. Brookbank of the Mead Corporation.

Mr. Southwick's experience in the packaging field includes twelve years with General Foods Inc. and several years with Shellmar Products. He has since opened his own consulting office in Mt. Vernon, Ohio to serve the packaging industry in general. His paper on the "Engineering Aspects of Packaging" attested to an expert's knowledge of the subject.

Packaging materials were defined by Mr. Southwick as those which make up the complete container of the product as it is received by the consumer, whereas, packing materials were defined as those which make up the container carrying the product during shipment. It was apparent that each product requires a detailed study before a package can be designed for it. Some of the factors the speaker pointed out as entering such a study are the requirements of the product itself, and the requirements of appearance, convenience, merchandising and cost. Emphasis was placed on the fact that the package must maintain the product in a state of suspended animation as closely as possible. With many products, particularly in the food line, having specific humidity requirements at which they will neither dry out or gain moisture, having specific oil or grease barrier requirements and specific vapor pressure requirements, the problems in this phase alone can be difficult.

Mr. Southwick illustrated his remarks in an interesting manner by selecting some well known products and showing how the nature of the product and the course of events between the source and the consumer establish the nature of the material in the package, its size, construction, appearance and cost. He predicted a great future for the flexible package, in which classification he included the fiber can, and also predicted that paper with plastics would enjoy a prominent place in that future.

Among those present were the following:

Harold C. Koch, Victor J. Wirpsa, Frank A. Root, Roy M. Miller, Edgar Turnbull, Fred G. Boyer, R. L. Betts D. J. Goodman, G. B. Janvrin, Robert L. Jenk, R. N. Campen, S. E. Knowles, John Locke, W. G. Palmer, John C. Redd, Art Thurn, D. M. Yost, Chas. Southwick, E. B. Brookbank, W. J. Carroll, A. H. Frazer, Harold Schultz, P. S. Cade, H. W. Vanderberg, R. D. McCarron, Harold Sinclair, H. C. Harvey, C. H. Butterfield, L. R. Kendall, J. E. Burdsall, John Owen, O. M. Cornell, L. F. Voglen, Bill Biven, F. Scharringhauser, H. A. Smith, H. Hixon, J. Fisher, C. Mohler, S. Bazler, B. Bunch, C. E. Brandon, P. M. Schaffrath, Truman Mathers, Leon Tyler, Simon Porter, William Gutzwiller, Paul C. Miller, Travis Q. Holden.

Kimberly Adds Week To Vets' Vacations

KIMBERLY, Wis. — Employes at the Kimberly mill of Kimberly-Clark Corporation who have 20 years or more of continued service will receive one additional week of vacation with pay, as a result of a bargaining session between K-C officials and a bargaining committee of the Mill Worker Union, Atlas and the Field Service group last week. About 260 at the local mill are affected.

The veteran workers will now receive three weeks' vacation, while the remaining vacation schedule will remain the same — one week for employes who have one or more years of continued service, and two weeks for employes who have five or more years of continued service.

During the vacation periods substitution overtime will be allowed for employes normally scheduled on other than a six-hour shift basis. Vacations for employes normally scheduled on other than a six-hour shift basis will be handled by providing replacements where in the management's opinion such replacements are necessary.

Similar vacation periods in other mills of the corporation are being studied.

Kalamazoo Stages Coating Symposium

KALAMAZOO—With a two-hour panel discussion Thursday evening of last week, the first all-day conference on the mechanical aspects of coating paper ever staged by the Michigan division of the American Pulp and Paper Mill Superintendents Association was brought to a close. The meetings were held at the Park-American Hotel and drew more than 250 paper mill operators and technicians. William H. Astle, president of the division, opened the meetings, with actual conduct of the entire affair in the hands of Olin W. Callighan, the division's secretary and treasurer, who also served as toastmaster.

John F. Halladay, paper mill consultant of Elkhart, was moderator. In his opening of the panel discussion he complimented the division's officers on the conference. So far as he knows, he said, the day brought together the largest gathering of coated paper operators and technicians the state has ever known.

The evening session was opened with a banquet, followed by a discussion and a movie of calendering operations by E. E. Thomas of the Appleton Machine Company. Part of the film was exposed in the coating mill operated by Time, Inc., at the Bryant Paper division. The close of his talk was the signal for the start of the panel's work.

During the afternoon two papers had been given. The first was on dry-

(Continued on page 30)

PANEL AT KALAMAZOO COATING SESSION

Shown in the picture, left to right, are A. A. Neese, Beloit, Wis.; E. E. Thomas, Appleton, Wis.; Richard Peeters, Kalamazoo; Charles Crow, Chillicothe, O.; Kenneth W. Osborne, Rittman, O.; Herman G. Rappolt, New York City; Norman I. Bearse, Lawrence, Mass.; and John F. Halladay, Elkhart, Ind.—Gazette photo.

HYCAR AMERICAN RUBBER LATEX...
imparts valuable properties to pulp and paper

HYCAR latex added directly to the pulp in the beater or head box, or used as an impregnant for paper, imparts valuable properties not otherwise readily obtained.

Tear and wet strength are considerably increased. Resistance to oils, solvents and chemicals is obtained, with retention of good aging properties. The addition of Hycar also insures excellent flex life and scuff resistance, and in thick papers prevents separation of the laminations.

Thus, better physical properties may be obtained in high grade pulp. In other cases the use of lower grade stock may be permitted because of improved physical properties obtained by the use of Hycar latex. Paper is made adaptable to fields where it is not now used.

Present and potential applications for papers of this sort range from wallpaper to insoles, from gaskets to leather replacement material, from shelf liners to packaging papers.

HYCAR latex is very easy to use. In most applications no vulcanization is required. Normal drying times are used. And HYCAR latex is an inherently safe material to handle. *No solvent system is needed.*

We would be glad to work with you on any problems relating to the use of HYCAR latex. For more information, please write Department HJ-4, B. F. Goodrich Chemical Company, Rose Building Cleveland 15, Ohio.

Hycar
Reg. U.S. Pat. Off.
American Rubber

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

FINANCE

Puget Sound Enjoyed Favorable Conditions

BELLINGHAM — A combination of favorable circumstances, and a singular absence of the unfavorable, enabled Puget Sound Pulp & Timber Company to convert 1947 into the best year in its history, F. G. Stevenot, president, states in his annual report made public this week. Factors shaping the record included higher prices for the company's products, sufficient log supply to permit capacity operation commenting in May, profitable operation of the industrial alcohol plant recently purchased from the government, and savings in operation of the new hydraulic barker and whole log chipper.

Independently audited net income for 1947 amounted to $4,822,901, as previously reported, including $131,218 net capital gain, the equivalent of $12.31 a share on 389,094 shares of common stock outstanding at the end of the year, comparing with $1,320,507, or $3.83 a share on 326,940 shares of common stock outstanding in 1946.

Good earnings enabled the company to attain a nearly debt-free position in 1947. During the year a total of $1,873,353 was paid on bank loans and other debts, eliminating all long-term debt except $111,296 on timber contracts payable 1949-1955, and $297,341 of current obligations for which provision was made for payment in 1948. Debt retirement in 1947 included complete payment for the alcohol plant purchased at the beginning of the year.

Through plow-back of earnings, the company expended $165,000 in equipping a plant to make a new pulp mill by-product which is used in manufacture of concrete and other building materials and as a binder. This new product, lignosite, is made from sulphite waste liquor after the alcohol has been extracted, and in its manufacture waste heat from the alcohol plant is used. The lignosite plant commenced operation in November.

A step toward an integrated operation was taken with the completion of a paperboard mill in May.

Capital structure of the company is now composed entirely of common stock, the preferred having been called for redemption at the end of 1947. Holders of all but 105 preferred shares converted their holdings into common stock.

High Costs Reduce Haloid Profits

ROCHESTER, N. Y. — Joseph C. Wilson, president, and Joseph R. Wilson, chairman of the board of directors of the Haloid Company, blamed an adverse price-cost relationship for reduced profits margins in 1947. Net income was $137,735, or 69 cents a common share after dividends on the preferred. This compared with $149,952, or $1.06 the previous year.

Volume of sales, $7,062,419, highest in the company's history, compared with $6,751,814 in 1946.

The report listed $341,542 in cash, $973,130 in accounts receivable, $1,647,174 inventory and $912,854 in plants and equipment.

Canadian Celanese Hits All-Time High

TORONTO — Net profit of Canadian Celanese Limited reached an all-time high of $3,025,462 in 1947 according to the annual report of the company issued to stockholders this week. This was an increase of more than $1 million over the previous peak of $1,972,310 established in 1946. After providing for preferred dividends, last year's net was equivalent to $7.25 per share on the common stock compared with $4.10 per share in 1946.

The strong position of the company to finance further expansion is indicated by the balance sheet, with cash, Government bonds and other securities alone aggregating $9,968,175 among current assets of $14,558,324 which were 6.1 times current liabilities of $2,395,409.

In April, 1947, the company sold two issues of debentures totaling $10 million and 100,000 shares of preferred stock. Proceeds from this financing were used partly to redeem $5 million of outstanding debentures.

After expenditure of $3,771,583 for the plant expansion program in 1947 compared with $2,594,664 spent in 1946, the company was able to show a substantial increase in net working capital at $12,162,915 at the end of 1947 compared with $6,806,470 a year earlier.

Niagara Chlorine Products Suffers Light Damage

LOCKPORT, N. Y.—Fire attributed to an overheated furnace caused $2,000 damage March 11th at the Niagara Chlorine Products Corporation, according to fire department officials. Firemen fought the blaze for an hour, confining the fire to the smelting house.

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending March 20, 1948

STOCKS

	High	Low	Last
A. P. W.	4⅞	4⅛	4¾
Armstrong Cork Co.	50⅛	47	50
Armstrong Cork Co., 4 pf. 4	108½	107¾	108½
Armstrong Cork Co., pf. 3¾	93½	92⅜	93½
Celotex Corp.	25	23⅜	25
Celotex Corp., pf.	19¼	18⅜	19¼
Certain-Teed Products Corp.	15⅜	13⅞	15⅜
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	20	18⅞	20
Champion Paper & Fibre Co., pf.	94¼	94¼	94¼
Congoleum Nairn Co.	32½	31½	32
Container Corp. of America	38	36	37¾
Container Corp. of America, pf.	....	....	....
Crown Zellerbach Co.	29	26¾	29
Crown Zellerbach Co., pf., 4.20	97	95½	97
Crown Zellerbach Co., pf., 4 pf. 4	108	103	108
Dixie Cup Co.	33½	33	33½
Dixie Cup Co., A	50⅛	49½	49½
Flintkote Co.	36⅛	31½	36⅛
Flintkote Co., pf.	99½	99	99½
Robert Gair	8⅛	7⅝	8⅛
Robert Gair, pf.	18½	18½	18½
International Paper Co.	48	42⅜	47¾
International Paper Co., pf.	....	....	....
Johns-Manville Corp.	36¾	34¼	36½
Johns-Manville Corp., pf.	106	105½	106
Kimberly-Clark Corp.	20	19	19⅝
Kimberly-Clark Corp., pf.	96½	96	96½
Mac Andrews & Forbes	36¾	36½	36¾
Mac Andrews & Forbes, pf.	....	....	....
Marathon Corp.	20¼	18⅞	20
Mead Corp.	17⅞	17½	17¾
Mead Corp., pf. 4¼	84	80½	81
Mead Corp., pf. 2	39	39	39
National Container Corp.	13	11¾	13
Paraffine Companies, Inc.	23¼	22	23¼
Rayonier, Inc.	26⅜	23	26⅜
Rayonier, Inc., pf.	32	31½	31½
Ruberoid Co.	58⅝	55	55
St. Regis Paper Co.	10	9	10
St. Regis Paper Co., pf.	82	81	82
Scott Paper Co.	41	40⅝	40⅝
Scott Paper Co., pf.	91½	91	91
Sutherland Paper Co.	38⅜	38⅜	38⅜
Union Bag & Paper Corp.	29¾	27⅞	29½
United Board & Carton	12⅝	11½	12⅝
U. S. Gypsum Co.	98	94¼	98
U. S. Gypsum Co., pf.	174	173	174
United Wallpaper	4¼	3⅞	4⅛
United Wallpaper, pf.	....	....	....
West Virginia Pulp & Paper Co.	40½	39⅛	40½
West Virginia Pulp & Paper Co., pf.	104	103	103

BONDS

Celotex Corp., 3½s '60	99¼	99	99¼
Certain-Teed Products Corp., 5½s '53	....	....	....
Champion Paper & Fibre Co., 3s '65	....	....	....
Mead Corp., 3s '68	....	....	....

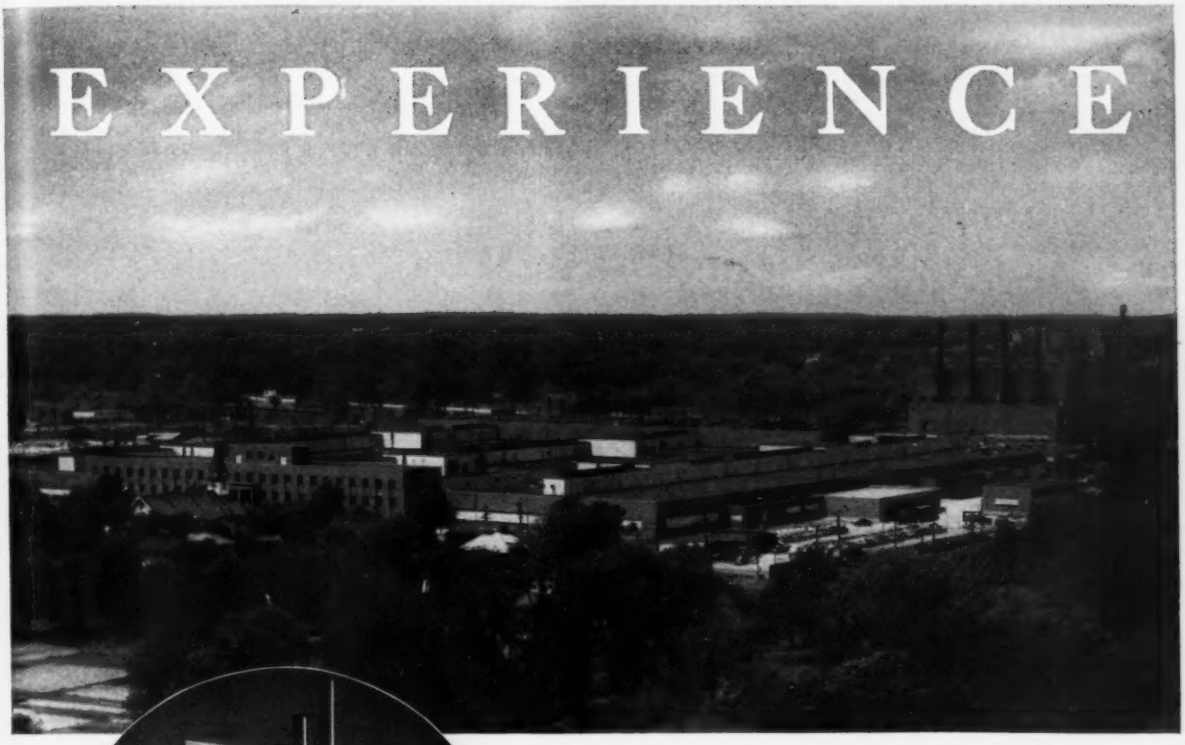
New York Curb Exchange

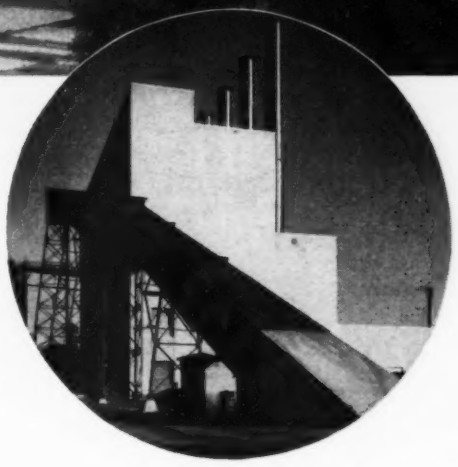
High, Low and Last for Week Ending March 20, 1948

STOCKS

	High	Low	Last
Great Northern Paper Co.	38½	36½	38½
Taggart Corp.	....	....	....

EXPERIENCE



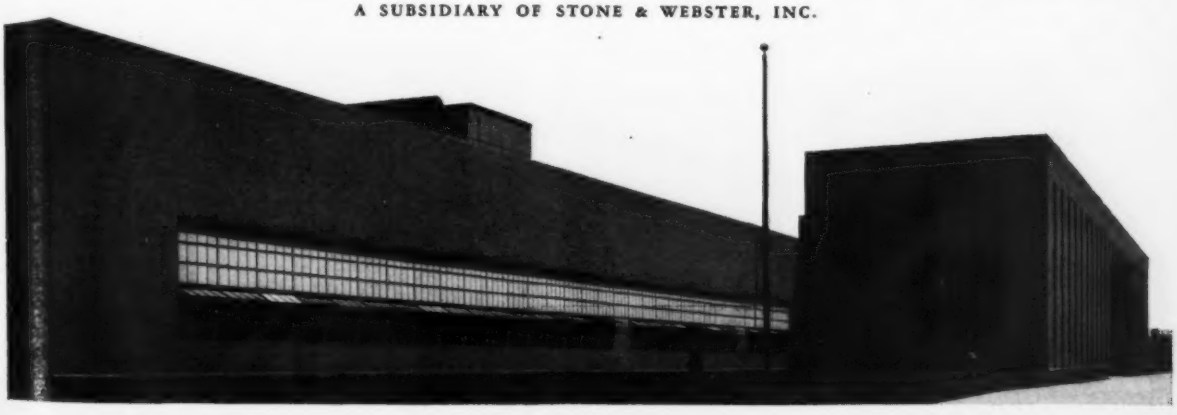


Stone & Webster Engineering Corporation designed and constructed this Plant at Fort Wayne, Indiana, for the Defense Plant Corporation. It was operated during World War II by General Electric Company.

DESIGNED and built during the War, this plant, now owned by General Electric Company, is an example of what Stone & Webster Engineering Corporation offers clients in the industrial fields.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.



Australian Paper Industry Will Meet in Tasmania

MELBOURNE — The second general conference and second annual meeting of the Australian Pulp and Paper Industry Technical Association will be held in Hobart, Tasmania, on April 12th to 14th inclusive.

Five technical sessions will be held during the day and evening of April 12th, and during the day of April 13th, while the second annual meeting and annual dinner will take place on the evening of April 13th. The conference will conclude on April 14th with an all-day inspection of the Boyer Mill and Risby's Basin woods operations and with a buffet dinner in the evening. During the excursion to the mill and woods, conference delegates will be the guests of Australian Newsprint Mills Ltd.

The technical sessions and annual general meeting will be held in the reception room at the Hobart Town Hall, while the annual dinner will be held at Hadley's Orient hotel.

The technical sessions will include symposia on wood preparation, on laboratory beaters and their correlation with mill beaters, and on mill stock preparation. There will also be discussions on logging, surface sizing on the paper machine, the pumping of eucalypt pulps and their flow in pipes, the physiological aspects of pulp and paper mill design, the Harland drive for paper machines, boiler feed water treatment and materials handling. A rapid capacitative method for the determination of moisture in pulp, paper and black liquor will also be discussed.

Representatives of company and sustaining members of the Association, as well as individual members from Victoria, New South Wales, New Zealand and the north and south of Tasmania will visit Hobart for the occasion. It is anticipated that 85 people will attend.

As President G. W. Ellis is not seeking re-election, a new president will be installed at the annual meeting, when in addition the results of an election to fill two vacancies on the Interim Executive Committee will be announced.

The Association has already taken steps to implement some of its aims and objects. Of fundamental importance to an industry such as the manufacture of pulp and paper, is the development of standard nomenclature, methods of testing and specifications. On these matters the association has been invited to cooperate actively with the Technical Section of the Paper-makers' Association of Great Britain and Ireland, the Canadian Pulp and Paper Association, the Technical Association of the Pulp and Paper Industry of the United States, and with the Food and Agriculture Organization of the United Nations. To this end, a testing committee of A.P.P.I.-T.A. has been set up and will hold its first meeting in Burnie, Tasmania, during the week commencing April 5th and concurrently with the ninth annual Pulp and Paper Cooperative Research Conference. With the aid of specialist sub-committees, the committee will give its attention to pulp and paper testing, non-fibrous materials testing, chemical methods and container testing and packaging.

Nopco Sales Rise As Net Is Reduced

NEW YORK—Nopco Chemical Company in 1947 established a new high record for dollar sales, it is disclosed in the annual report being mailed to stockholders. Consolidated net sales for the year amounted to $18,493,709, compared with $16,951,352 for 1946.

Net income for 1947, after all charges and taxes, totaled $694,737, equal after preferred dividend requirements to $2.89 a share on 220,010 shares of common stock outstanding on December 31. For 1946, net income of $1,-012,735 was earned, the highest in the company's history. This was equal to $4.69 a share on 215,938 shares of common stock, the average number outstanding during the year.

Working capital at the close of 1947 amounted to $5,360,317, the ratio of current assets to current liabilities being 4.65 to 1, compared with 2.65 to 1 a year earlier. Inventories of $4,471,-601 were lower than the year before, notwithstanding a substantially higher level of prevailing prices.

Manhattan Rubber Advances Teeling

PASSAIC, N. J. — R. F. Teeling of Raybestos-Manhattan, Inc., Manhattan Rubber Division, was appointed manager of the local sales branch formerly known as "New Jersey Sales," and which will now function as "North Jersey Branch," to better signify the area of activity of this unit. Mr. Teeling was assistant manager under Grannell E. Knox, who was manager of the New Jersey Sales Branch for 34 years until his death in January. Mr. Teeling has been with the company for 36 years.

Appleford Starts Building

HAMILTON, Ont.—Construction of a new million-dollar plant for Appleford Paper Products, Limited, on the company's seven-acre Parkdale Avenue site will begin in April, according to George F. Clark, president.

Boston Paper Trade Elects W. N. Stetson

BOSTON — With 214 in attendance, the annual meeting and dinner of the Boston Paper Trade Association was held at the Hotel Somerset, March 17, when William N. Stetson, Storrs & Bement Company, was elected president.

Other officers elected were: First vice-president, Henry S. Savage, International Paper Company, New York; second vice-president, Floyd H. Blackman, D. F. Munroe Company; treasurer, T. Charles Casey, Casey, Bigley Company; secretary, Norman E. Scott; auditor, William C. Ross.

The following committees were chosen: Executive, W. Edwin Porter, Jr., Norman Harrower and Matthew O. Byrne; arbitration, George W. Wheelwright, chairman, Charles A. Shaw, Harry C. Thayer, Albert P. Carter, and H. Frank Merrill.

The dinner was preceded by a reception. After cigars were lighted at the end of the meal, President James R. Carter, II, called the meeting to order. The report of the treasurer, T. Charles Casey, showed the organization in good financial condition. Taps were sounded for Mark H. Warren, Charles A. Esty and Arthur J. Pierce, who had passed away during the year.

Colonel Charles S. Proctor, chairman of the nominating committee, announced the names of candidates, all of whom were unanimously elected to office.

The retiring president, Mr. Carter, after the election, turned the gavel over to Mr. Stetson, the president-elect.

The evening's program closed with an exhibition by Warren Simms in his "Modern Magical Mysteries."

Shapiro Resumes "Paper Topics"

NEW YORK — Publication of *Paper Topics*, house organ of the Shapiro Paper Corporation, 450 Seventh Avenue, which had been discontinued during the war, is now being resumed. While format and cover design have been changed, and spot illustrations added, the publication continues to be a chatty, informal eight-page job designed to do nothing more than keep printers and lithographers informed in matters relating to their business.

The current issue treats with such things as paper, paper money, paper methods, polygraphs, gold, maternity clinics, taxes, Thomas Jefferson and other chit-chat culled while calling on the trade.

Jesse Shapiro, president of the corporation, declares that the subscription rates have not been increased: a fifty-year subscription to *Paper Topics* for a penny post-card upon which the subscriber has written his name and address.

For better paper softening at lower cost ... plus effective flameproofing

use

DU PONT SULFAMIC ACID

(the basic material in making Amine Sulfamates)

You simply add Du Pont Sulfamic Acid to the desired amine and apply the resulting Amine Sulfamate to your paper or paper products to get these outstanding results.

More Effective Softening

Amine Sulfamates provide excellent softening—even at low humidities. And they are more effective over the whole humidity range, because they do not depend entirely on water pick-up for their action.

Fire and Yellowing Resistance

Paper products are effectively flameproofed, as well as softened, by Amine Sulfamates. A single treatment does the whole job.

Color Stability: In "Fadometer" tests, papers treated with an Amine Sulfamate and modifying agents show complete absence of yellowing, even after a 320-hour exposure.

Low-Cost ... Easily Applied

Du Pont Sulfamic Acid is inexpensive. And when added to amines, it can be easily and uniformly applied by either immersion or spray treatment—at any stage after the dry cans. Amine Sulfamates may also be added to coating compositions and used in many other paper converting operations.

Technical Service

For samples and further information on Sulfamic Acid, write Du Pont today. A technical representative will be glad to call and discuss the application of Du Pont Sulfamic Acid to your operation. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Wilmington 98, Del.

. . .

Where flameproofing without softening action is required, the regular Du Pont Fire Retardants are recommended.

Helps you make better

PAPER DRAPERIES
PAPER NAPKINS
PAPER TOWELS
PAPER TABLECLOTHS
TISSUE PAPERS

and many other

PAPER PRODUCTS

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING ... THROUGH CHEMISTRY

DU PONT SULFAMIC ACID

Powell River Makes Ready for Its Next Machine No. 8

VANCOUVER, B. C.—The Powell River Company, with all major designs completed, the manufacture of the equipment well advanced, and building construction approaching completion, this week found it possible to release technical information concerning the project. Decision to proceed with the installation was first made known late in 1946.

The new paper machine will be installed in a building which was partially completed in 1930 when Paper Machine No. 7 was acquired. It will be of the same width (226 inches wide) as the 1930 machine. It will be capable of mechanical operation at speeds up to 2000 f.p.m., or 600 f.p.m. faster than the older machine. Most of the improvements developed in the newsprint industry since 1930 will be incorporated in it.

The stock inlet will be of an entirely new design, developed by the Powell River Company. Totally enclosed, it will operate under conditions of constant level and variable pressure. It is expected to extend the range of commercial operation well beyond existing limits.

The Fourdrinier will be of the conventional removable type, with certain novel features such as automatic wire tensioning equipment. It will be provided with centrifugally cast bronze breast and wire rolls, rubber-covered steel table rolls, and plastic-coated steel suction boxes.

The suction couch roll will be of large diameter equipped with a double-compartment suction box and top pressure roll, for safe and efficient operation at high speeds.

The press section, which will be particularly compact, will contain two suction presses arranged for automatic loading. Enclosed gear top roll lifting mechanisms will be used. The press doctors will discharge onto belt conveyors.

The dryer section will contain fifty-two main dryers and ten felt dryers, arranged in four sections. The drying cylinders will run in pivoted shoe bearings and will be driven through single helical gearing completely enclosed in the rear frames. All gears and bearings will be lubricated under pressure by means of a central oil filtration plant. Condensate will be removed from the drying cylinders by means of internal baffles and syphon pipes with scoop tips.

The calender will be of conventional design equipped with hollow dynamically balanced rolls carried in anti-friction bearings.

The reel will be of the Pope type, specially designed to produce reels of double the normal diameter, a feature which is expected to reduce the time lost between reels in the rewinding operation.

The winder will be of the double drum type, with individual motor-driven slitters and automatic roll discharging equipment.

The paper machine drive will be of the Harland sectional electrical type. The main motor-generator set will be coupled to a back-pressure steam turbine, through which all process steam required by the machine will be passed. Some 2500 k.w. of relatively cheap power will thus be available to augment the Powell River Company's hydro-electric power.

Vapor removal and ventilation will be accomplished by introducing fresh air at both ceiling and working level. All air will be exhausted via an aluminum hood and plenum chamber related to the dryer section. Heat will be recovered from the exhaust air by means of economizers, which will heat the incoming fresh air, and spray towers, which will supply hot water for process purposes.

Automatic process control equipment will be used somewhat more extensively than heretofore. It is expected to make operation at high speeds easier and more effective.

Among the contractors engaged upon the paper machine project are the following:

General Construction—B. C. Bridge & Dredging Co. Ltd., Vancouver, B. C.

Paper Machine — Dominion Engineering Works, Ltd., Montreal, P. Q.

Paper Machine Drive—Bepco (Canada) Ltd., Westmount, P. Q.

Vapour Removal System—Ross Engineering Co. of Canada Ltd., Montreal, P. Q.

Steam Turbine — De Laval Co., Trenton, N. J.

Stock Inlet — Vancouver Engineering Works Ltd., Vancouver, B. C.

It is expected that the new machine will be ready for operation during the third quarter of 1948. Modifications of and extensions to other parts of the mill, in anticipation of the increased demands upon them when the machine commences operation, are keeping pace with the paper machine project.

When the new machine comes into operation it will boost Powell River's newsprint production to approximately 265,000 tons per annum.

Installing sole plates for Powell River Company's No. 8 paper machine, to be ready for production by Fall of 1948.

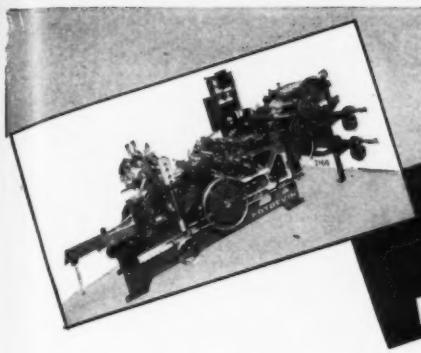
U. S. Chamber Studies Employe Relations Programs

WASHINGTON—A detailed study by Chamber of Commerce of the United States of employer-employee activities of trade associations discloses that in many industries these activities have made important contribution toward improved labor relations.

Milton D. Smith, assistant manager of the Chamber's Trade Association Department, who directed the study, declares that association activities aimed at assisting employers in conducting their own negotiations with unions and related activities seeking to promote sound employment standards have been of benefit not only to industry, but also to employees and the general public. Good working conditions, stabilization of employment, and the many other improvements in employer-employee relations resulting from Association-sponsored programs, Mr. Smith points out, all contribute to greater and more efficient production, better earnings for employees and more and better goods for customers.

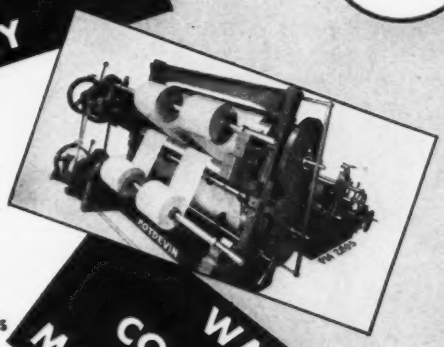
Macfarlane Re-elected

MENASHA, Wis. — William Macfarlane last week was reelected president of the Banta Benefit Association of the George Banta Publishing Company, for his twelfth term.



CELLOPHANE & PAPER BAG MACHINERY

POTDEVIN



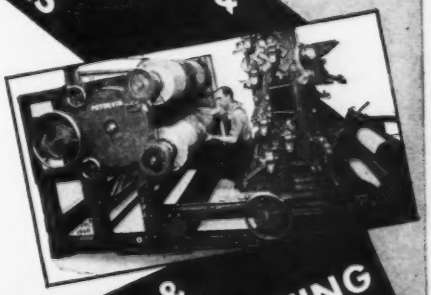
Experience Is Still "HARD-TO-GET"

With production now in full swing again, material shortages are easing. "Experience", however, vitally necessary for proper machine design and construction, is still in the "hard-to-get" category.

The experience represented by POTDEVIN'S rich storehouse of proven designs, patterns, patents, developments and ideas, gathered over half a century, is yours with every machine.

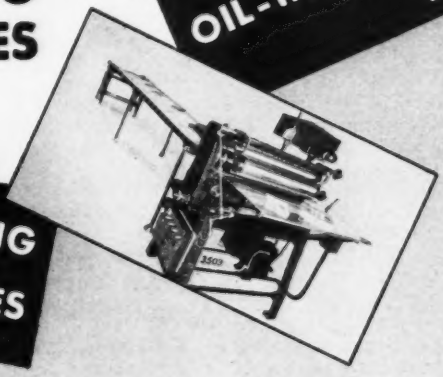
With this long and successful experience an integral part of each machine, your POTDEVIN equipment will give you longer, more efficient, and more profitable service.

WAXING & COATING MACHINES

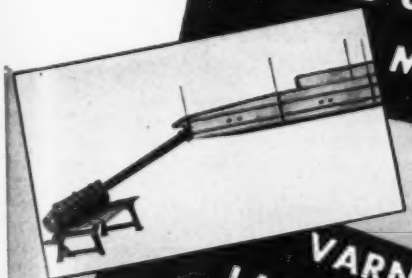


ANILINE & OIL-INK PRINTING PRESSES

POTDEVIN
CONVERTING, PRINTING & COATING MACHINES



PASTING & GLUING MACHINES



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Read Submits Plan For Power Survey

HOLYOKE, Mass.—A proposal that the Municipal Gas and Electric Department, the Holyoke Water Power Company, and the city's paper manufacturers undertake a joint survey of the feasibility of altering the Holyoke dam to develop more power, has been advanced by Fayette F. Read of George W. Prentiss & Company.

Mr. Read is chairman of the paper manufacturers' committee opposing the application of the Gas and Electric Department before the Federal Power Commission to take over the power generating facilities of the Holyoke dam. However, his suggestion was made personally and not as chairman of this group.

He presented his plan to the Gas and Electric Commission, Robert E. Barrett, president of the Holyoke Water Power Company, Mayor Henry J. Toepfert, the Central Labor Union and the Chamber of Commerce, all of whom had taken various stands on the proposed federalization of power here—a program that would rob the paper manufacturers of their important power rights along Holyoke's canal system.

Mr. Read suggested that the Gas and Electric Department withdraw its pending application before the FPC, and to enter jointly with the power company and the paper manufacturers on a survey of a plan that would utilize more fully the power potential here.

Mr. Read also suggested the installation of Taintor gates at the dam to raise the water level at other than flood times to 106 feet. The present crest level is 97.5 feet.

He suggests the building of a power house outside the abutment of the dam that would use as much as possible the river flow above 100 feet.

Mr. Read argues that such a joint study would contribute to the industrial peace of Holyoke and would remove the uncertainty that now plagues the paper manufacturers, who have indentures with the Water Power Co., that offset in part the competitive disadvantages the local mills have in distance from markets and raw material centers.

At the weekly meeting of the Holyoke Chamber of Commerce board of directors, the Read report was read and discussed. President John N. Hazen was authorized to appoint a committee to make a special study of the Read program and to report on it at an early meeting.

The Holyoke Water Power Co., immediately agreed to cooperate with Mr. Read's plan to get together with the various interests involved in the present power controversy.

The Municipal Gas and Electric Department, however, remained mum on the subject. Manager Francis H. King said he would not make a statement on the situation until after he has met with Gas & Electric Commissioners Edward D. Hallisey and Fairfield Whiting. He said his action was on instructions from Commissioner Hallisey.

Mayor Toepfert asked for more time to study the Read proposal.

Robert E. Barrett, president of Holyoke Water Power Co., was quick to recognize the significance of the Read proposal. He said "the Holyoke Water Power Co., will be glad to cooperate with the city government, the Gas and Electric Department, and the manufacturers' group in accordance with the proposal."

Says Railroads Lack 40,000 Freight Cars

BOSTON, Mass.—President William T. Faricy of the Association of American Railroads has said the needs of the nation's railroads for freight cars "simply must come first" in any allocation of scarce materials for civilian use.

He told a meeting of the New England Shippers Advisory Board that an increase in the supply of railroad freight cars is a must in this time of "potential national peril."

"Threats of war hang like a cloud over the entire civilized world," he said, "and the tough talk on both sides of the Atlantic could scarcely be tougher if we really were at war.

"With the exception of the armed forces themselves, no part of the process of putting ourselves in readiness is more important than getting the railroads in shape."

In World War II, he said, the railroads carried 90 percent of America's war freight and 97 percent of its military travel.

Faricy said that more freight cars were junked than were built in 1947 and today there are 40,000 fewer freight cars in service than there were at the war's end.

To increase the output of steel, he said, carriers have instituted a clean-up drive for collection of all available iron and steel scrap on the railroads, which "are our best source for scrap metal."

Tampax Proposes to Keep Rutland Plant

PALMER, Mass. — Tampax, Inc., which operates its main plant here in Palmer, proposes to keep a small division in Rutland, Vt. Tampax opened the Rutland division during the war as an overflow of the Palmer mill. It had rented space but recently bought a plant there.

John R. McLaughlin, recently transferred to Rutland from Palmer, is the mill superintendent. Tampax employs 96 people in Rutland and has 40,000 square feet of manufacturing space and 20,000 square feet of warehouse space.

Keith Tightens Its Production Set-Up

TURNERS FALLS, Mass. — Increased manufacturing efficiency with routine post-war changes have resulted in several lay-offs of employes at the Keith Paper Company mills, Paul E. Hodgdon, president and treasurer, has declared. Hodgdon did not disclose the number who have been discharged, but admitted 245 are employed there now. Assistant Manager T. R. Probst said on Dec. 6, 1946, that employment was about 325 at that time.

Hodgdon also made known the resignation, effective April 1, of Shannon B. Earley, purchasing agent at the plant, who is leaving to assume a similar position with the Oxford-Miami Paper Co., in Dayton, Ohio.

Production at Keith is running the same, Hodgdon said, despite cuts in employes. "The fine writing business is 'off' and has been for seven or eight months," Hodgdon explained. He said Keith has "changed one machine to make glassine and grease-proof" paper. The machine, he stated, can now handle the work in addition to the writing paper. Manufacture of glassine and grease-proof paper, said Hodgdon, is not as competitive as the fine writing business.

The lay-offs have been over a year and a half, Hodgdon said. The company has no future major lay-offs in mind, Hodgdon said, but will attempt to increase manufacturing efficiency. New equipment for the company has been found capable of operating with less man-power, he explained.

"Some were discharged temporarily, I hope," the president remarked. "With a slight change in the type of business we would re-employ 10 or -5."

No successor for Earley has as yet been named, Hodgdon said. His work has been distributed to other officers. If that doesn't succeed, he said, a replacement will be named.

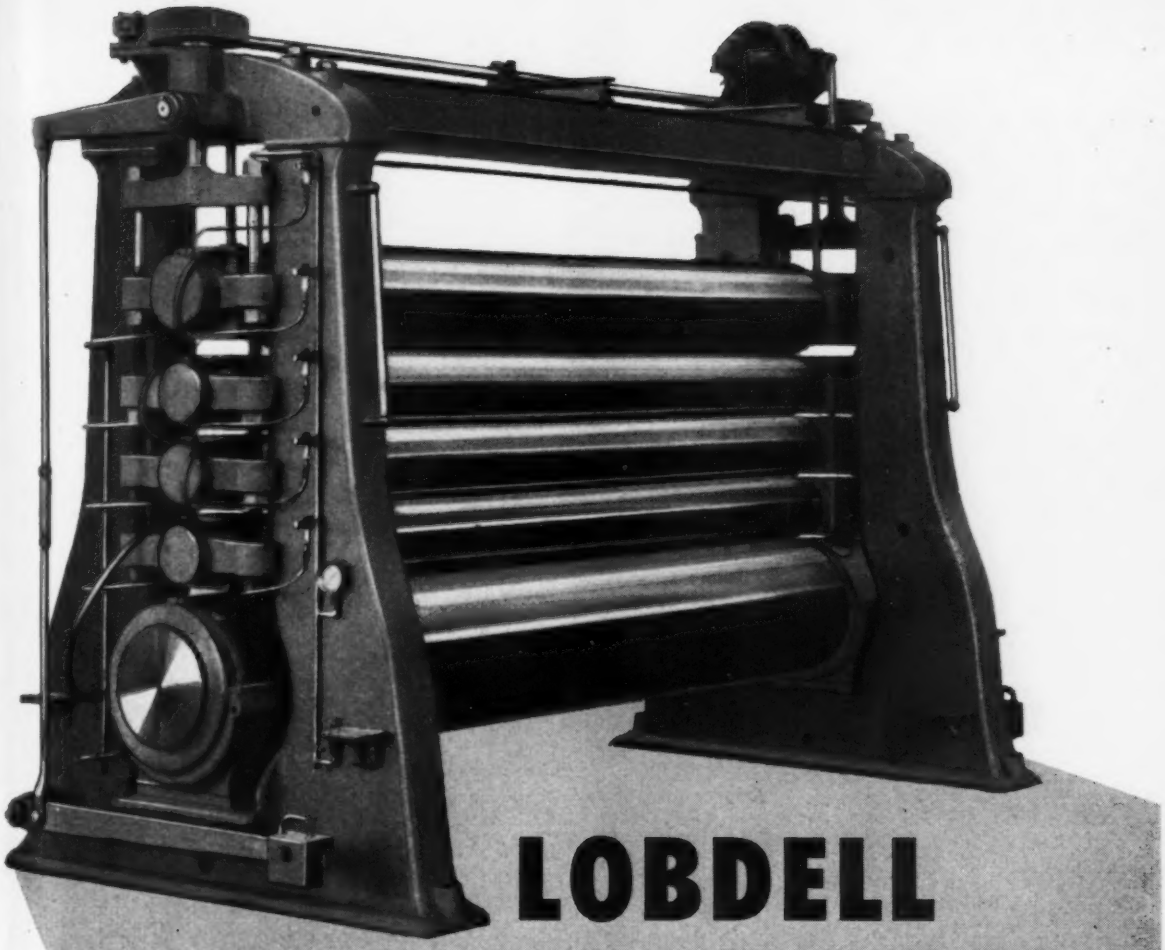
Earley was a former selectman in Monroe, and during the war served with the Army Air Corps in England. After his discharge he assumed a position at Keith.

Pennsalt President Elected to Industrial Conference Board

PHILADELPHIA — Leonard T. Beale, president of the Pennsylvania Salt Manufacturing Company, was elected a member of the National Industrial Conference Board at the board's recent meeting in New York.

The Conference Board, founded in 1916, is an independent and non-profit organization for research and education in the fields of economics and business. Work of the board is supported by nearly 3,000 business concerns, trade associations, labor unions, government bureaus, libraries, colleges and universities.

Mr. Beale for many years has been active in the organization's work.



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Congress Committee Awards Third Quarter Contracts

WASHINGTON—Awards were made public this week by the Joint Congressional Committee on Printing for paper for use of the Government Printing Office for the three-months' period beginning April 1, 1948. Bids for the paper were received last week.

The awards are as follows, the number referring to that under which the offer was made, as published last week.

No. 3, Mead Sales Co., 11.67 cents.

No. 4, Mead Sales Co., 11.67 cents.

No. 5, Mead Sales Co., 11. 67 cents.

No. 6, Mead Sales Co., 10.83 cents.

No. 7, Mudge Paper Co., 10.82 cents.

No. 8, Mead Sales Co., 10. 83 cents (80,000 pounds); Mudge Paper Co., 10.82 cents (60,000 pounds).

No. 9, Mead Sales Co., 10.83 cents.

No. 10, Paper Corp. of United States, 12.93 cents.

No. 18, Mead Sales Co., 10.40 cents.

No. 19, Barton, Duer & Koch Paper Co., 11.83 cents.

No. 20, Barton Duer & Koch Paper Co., 10.78 cents.

No. 21, Stanford Paper Co., 12.78 cents.

No. 22, Mead Sales Co., 10.89 cents.

No. 34, R. P. Andrews Paper Co., 8.85 cents.

No. 37, Barton, Duer & Koch Paper Co., 11.30 cents.

No. 40, Consolidated Water Power & Paper Co., 10.985 cents.

No. 41, rejected.

No. 45, R. P. Andrews Paper Co., 10.19 cents.

No. 46, Cauthorne Paper Co., 14.60 cents.

No. 47, Old Dominion Paper Co., 14.60 cents.

No. 48, Paper Corp. of U.S., 13.95 cents.

No. 49, Paper Corp. of America, 15.70 cents.

No. 50 R. P. Andrews Paper Co., 19.70 cents.

No. 52, Paper Corp. of U.S., 14.95 cents.

No. 53, Cauthorne Paper Co., 14.35 cents (70,000 pounds); Cauthorne Paper Co., 13.55 cents (130,000 pounds); Stanford Paper Co., 13.18 cents (200,000 pounds); R. P. Andrews Paper Co., 11.07 cents (600,000 pounds).

No. 54, Paper Corp. of America, 14.95 cents (50,000 pounds); Barton, Duer & Koch Paper Co., 11.95 cents (40,000 pounds); Paper Corp. of U.S., 13.67 cents (400,000 pounds).

No. 55, Andrews Paper Co., 10.05 cents.

No. 56, R. P. Andrews Paper Co., 9.46 cents.

No. 57, Bulkley Dunton & Co., Inc., 16.07 cents.

No. 58, Paper Corp. of U.S., 14.45 cents.

No. 59, Paper Corp. of U.S., 13.39 cents.

No. 63, Mudge Paper Co., 17.48 cents.

No. 64, Old Dominion Paper Co., 17.998 cents.

No. 65, Old Dominion Paper Co., 17.998 cents.

No. 68, Barton, Duer & Koch Paper Co., 19.30 cents (150,000 pounds); Stanford Paper Co., 19.49 cents (125,000 pounds).

No. 69, Franklin Research Co., 20.75 cents.

No. 72, Paper Corp. of U.S., 16.90 cents.

No. 74, Wilcox Walter Furlong Paper Co., 18.10 cents.

No. 76, Walker Goulard Plehn Co. Inc., 25.76 cents.

No. 78, Walker Goulard Plehn Co. Inc., 26.06 cents.

No. 85, Butler Co., 27.47 cents.

No. 102, Walker Goulard Plehn Co. Inc., 14.00 cents.

No. 103, Walker Goulard Plehn Co. Inc., 14.70 cents.

No. 105, Barton, Duer & Koch Paper Co., 18.90 cents.

No. 106, Stanford Paper Co., 17.09 cents.

No. 107, Stanford Paper Co., 17.09 cents.

No. 109, Butler Co., 16.36 cents (100,000 pounds); Stanford Paper Co., 16.36 cents (100,000 pounds); John W. McNeil Inc., 16.36 cents (100,000 pounds).

No. 113, Barton, Duer & Koch Paper Co., 17.67 cents.

No. 114, John W. McNeil Inc., 17.36 cents.

No. 150, Walker Goulard Plehn Co. Inc., 14.00 cents.

No. 151, Walker Goulard Plehn Co. Inc. 14.00 cents.

No. 153, Walker Goulard Plehn Co. Inc., 13.25.

No. 154, John W. McNeil Inc., 17.28 cents.

No. 156, Walker Goulard Plehn Co. Inc., 17.35 cents.

No. 157, Stanford Paper Co., 17.73 cents.

No. 158, Walker Goulard Plehn Co. Inc., 17.85 cents.

No. 177, Mudge Paper Co., 29.88 cents.

No. 191, R. P. Andrews Paper Co., 19.25 cents.

No. 196, Barton, Duer & Koch Paper Co., 30.69 cents.

No. 202, R. P. Andrews Paper Co., 13.24 cents.

No. 203, R. P. Andrews Paper Co., 13.24 cents.

No. 206, R. P. Andrews Paper Co., 19.48 cents.

No. 252, Stanford Paper Co., $22.35 (per 1,000 Sheets).

No. 265, R. P. Andrews Paper Co., 13.48 cents.

No. 280, R. P. Andrews Paper Co., 15.55 cents.

No. 302, Old Dominion Paper Co., $78.574 (per 1,000 Sheets).

No. 306, Barton, Duer & Koch Paper Co., 12.60 cents.

No. 308, Walker Goulard Plehn Co. Inc., 13.75 cents.

No. 309, Walker Goulard Plehn Co., 13.18 cents.

No. 310, R. P. Andrews Paper Co., 14.40 cents.

No. 325, Witaker Paper Co., 8.32 cents (3,000,000 pounds).

No. 326, Walker Goulard Plehn Co. Inc., 12.00 cents (1,000,000 pounds).

No. 327, Marquette Paper Corporation, 11.60 cents (400,000); R. P. Andrews Paper Co., 8.04 cents (2,400,000 pounds).

No. 352, R. P. Andrews Paper Co., $31.71 (per 100 Sheets).

No. 360, Whitaker Paper Co., 4.974 cents.

No. 369, Mead Sales Co., 5.60 cents (Caliper .060 and Up); Mead Sales Co., 5.975 cents (Caliper .050).

No. 370, Mead Sales Co., 5.60 cents (Caliper .060 and Up); Mead Sales Co., 5.975 (Caliper .050).

Saltonstall Favors Federal Seaway Plan

SPRINGFIELD, Mass.—Senator Leverett Saltonstall, Republican of Massachusetts, has gone on record that he favors a federally-operated power project supported by numerous paper manufacturers throughout Northern New England.

The undertaking, he stated, should provide power for at least portions of New England.

This project was part of the St. Lawrence Seaway Plan, which Senators Saltonstall and Henry Cabot Lodge, also of Massachusetts, opposed and which was recently defeated in the Senate.

The Senator said that he is ready to support the power portion of the plan and he believes it should be operated by the federal government to assure New England getting some of the power. Under the Seaway Plan, New York state would have controlled this country's share of the power.

The project, said the Massachusetts Senator, should be able to provide power for Vermont and other parts of New England, although he is doubtful, he added, if it would furnish a substantial amount of power for Massachusetts.

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A reproduction of this incident from the fabulous life of Paul Bunyan—the twenty-eighth of a series—will be sent on request. It will contain no advertising.

G. E. Pittsfield Plant Is Declared Safe

PITTSFIELD, Mass.—The safety practices at the local plastics plant of the General Electric Company eliminate any possibility of a dangerous explosion such as the one which occurred recently at the Interlake Chemical Company plant at Waltham, according to Fire Chief Thomas F. Burke and William M. Rogers, manager of the Berkshire Safety Council, who inspected the local plant at the invitation of the company.

Escorted by John L. McMurphy, compound division manager, and Arthur G. Sanford, chemical department safety engineer, Chief Burke and Mr. Rogers were assisted in their inspection of safety facilities by John D. McIver of the State Department of Labor and Industries. Unable to attend was James Dixon of Lenox, whose letter to the Berkshire Evening Eagle, a local newspaper, questioning safety conditions at the local plant, prompted General Electric's request for the inspection.

Mr. Dixon's letter had pointed out that explosions are experienced periodically in any factory "where fine combustible dust is incidental to operations." Well known to Chief Burke and Mr. Rogers, G.E. officials said, was the fact that any explosion is serious only if confined. If adequately vented, a dust explosion is simply a minor puff rather than the violent blast experienced at Waltham.

Mr. McMurphy explained that equipment in the GE building is protected by explosion vents as recommended by the National Fire Protection Association. In addition, the building itself is fitted with explosion vent windows which cannot be fastened permanently and which will always open up under a few ounces of pressure. These are tested frequently and are so easily operated that they are sometimes accidentally blown open by sudden gusts of wind.

Although the vents and windows are installed to minimize an explosion after it occurs, Mr. Sanford pointed out that the primary protection is seven huge ventilating systems designed to remove 60,000 cubic feet of air per minute and practically all the dust generated in the manufacturing operations. When a small amount of dust does accumulate, all surfaces are completely vacuumed, he said.

Mr. Dixon's letter made reference to the possibility of lung injuries from the inhalation of dust-laden air.

"It is a matter of record," stated Dr. E. G. Bagnulo, company physician, "that employees who have been on this work for 25 years and have had periodic X-rays, have no dust deposits in their lungs and have suffered no ill effects from working here. Experience and experiments show that this type of dust is not injurious to the respiratory system."

New Owner Hinted For Carew Mill

HOLYOKE, Mass.—The Carew Manufacturing Company, of South Hadley Falls, one of the first paper mills established on the banks of the Connecticut River here, is to change ownership, reliable reports indicate. No confirmation of this report was immediately available at the plant. However, Bulkley S. Griffin of Washington, newspaperman who has financial interests in the firm, said that any statement about Carew should come from Atty. Russell L. Davenport. Atty. Davenport left recently for a vacation in Bermuda.

The Carew company, was organized 99 years ago. It is one of the best-known fine paper mills in the country, and during World War II made quantities of currency for invasion purposes along with the Parsons Paper Company, of this city.

Cortland S. Griffin of Longmeadow, who is critically ill, is the principal officer of the Carew Manufacturing Company.

Contract is Let for Coosa Mill Construction

BIRMINGHAM, Ala. — Contract for the $30,000,000 plant of the Coosa River Newsprint Company, at Childersburg, Ala., was awarded jointly to the Daniel Construction Company, Birmingham, and the F. H. McGraw Construction Company, Hartford, Conn.

A. H. Wakeman, vice-president and general manager of the paper company, said ground would be broken within a week, after which Raymond Concrete Pile Company will begin work on the mill foundation.

Twin City Council Sets Up Divisions

NEENAH, Wis. — An executive committee of 12 was named last week by the Twin City Safety Council, and the council was reorganized into two sections—community safety and industrial safety. The executive committee named Al Johnson general chairman, and Don W. Colburn, general secretary.

The executive committee will chart the program for all community organizations to the end that community safety will be expanded within Neenah and Menasha, to bring about safety-consciousness in every individual.

New England Awaits Senate's Action on Flood Control Bill

(Continued from page 7)

costs remain, the over-all cost may run as high as $120,000,000, Army engineers have predicted.

The Barre Falls reservoir will cost a total of $1,879,000 to construct, ut Army engineers have recommended that they need only $754,000 during the fiscal year which starts July 1.

Peoria Tells How to Set Up Board Plant

WASHINGTON—As a contribution to the movement to stabilize rural economy by establishment of new industries in small towns and open country locations, the United States Department of Agriculture's Northern Regional Research Laboratory, Peoria, Illinois, has issued the first of a series of exploratory studies. Circular 762 appraises the feasibility of manufacturing insulating building board from straw in farm communities.

This initial study points to the development of a process for producing 25/32-inch thick sheathing board in 4-by-4 feet panels from wheat straw, utilizing a plant which would employ 11 men and turn out 4,500 square feet of building board daily. Such product would, it is said, meet commercial specifications for insulating sheathing board.

The mere process of manufacture presents only one part of the business picture in such rural industries, it is pointed out. Hence the study considers such important factors as location of raw materials, character of the trading area, labor costs, merchandising, and business management—any or all of which may limit successful use of the process. The study indicates, the Department shows, that in some areas the process could not succeed, in many it might prove marginal, although in others and under good management it probably would succeed.

To place this initial study and the first process resulting from it on a plane of practical consideration, research engineers at the Northern Laboratory designed and built much of the pilot-plant equipment by which the wheat straw was processed from the initial cooking to the finished 4-by-4 foot sheathing board. Also, as a part of the study, a complete list of equipment, to be purchased or made locally, has been listed and described. The chemicals needed, directions for using the chemicals, layout plans for a small rural plant, and complete operational detail all have been worked out and an operating manual prepared. In this manner, manufacture of the sheathing board has been demonstrated, and the equipment is still available at the Laboratory for demonstrations to those interested in building a rural plant. In fact, the research engineers suggested strongly that observation of the process at the laboratory is essential to those who would undertake its operation.

This study, the Department of Agriculture states, brings into clear perspective the economic, merchandising, business, and manufacturing problems of a small rural plant for making nonfeed or nonfood products from agricultural materials in competition with large-scale, highly mechanized industries that make and distribute established products on a national scale.

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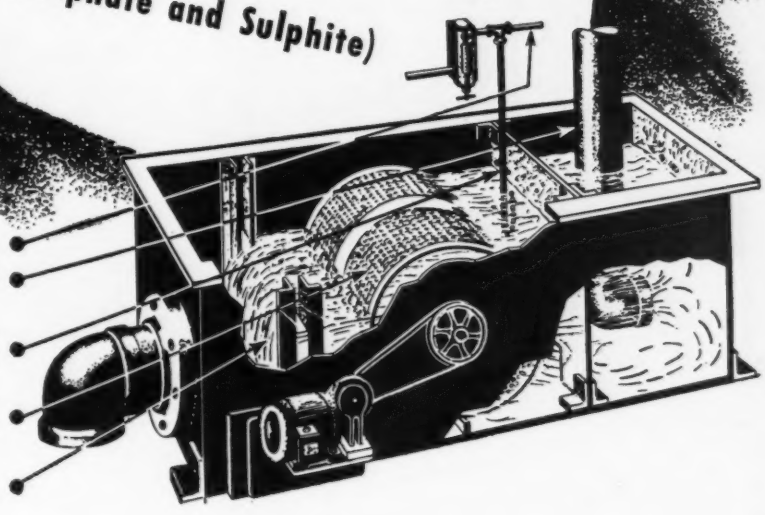
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It features an efficient, patented mixing box ... increases the capacity and efficiency of screens... gives higher tonnage output with lower loss of good pulp... reduces pumping costs ... increases capacity of present mixing and agitator systems.

Simple in operation, the Askania system requires only a continuous sampling of stock for regulation. It can be installed in conjunction with existing equipment.

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TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, March 24, 1948.

While conditions in the fine paper field appear to be generally favorable and more stable than for a long while, little improvement is seen in the tissue situation, none at all in wrapping paper.

Reports of critical shortages amounting to distress pour in from practically all sections of the country for this fundamental commodity, wrapping paper. Even in southern sections, where supplies theoretically should be more plentiful by reason of their nearness to producing mills which can avoid expensive transportation by distributing to nearby outlets, is there in sufficient supply to meet the demand of large and small businesses alike.

Investigation reveals that a general shortage exists with no relief contemplated. Additional kraft capacity going into production is being directed into multi-wall bags and other products where the dollar return is greater. Only seven mills are producing kraft wrapping for the American consumer demand which has been increased by new population and per capita need to the point where approximately only one-third is being met.

And what supplies are available are on allotment basis, much too inadequate for dealer needs. Thus a healthy gray market has been created where merchants are compelled to pay three times the market price in an attempt to take care of old customers. How long this condition can continue is not easily answered.

Shortages of tissues continue critical. This situation is viewed as failure to keep abreast of per capita demand rather than diversion of raw material to more lucrative products. Improvement is looked for gradually.

Against such a background, the fine paper field is steady and healthy. Prices are at least temporarily stable, and supply is much improved on sulphite. Rag content, however, continues soft and slow-moving with inventories heavy. Resistance is reported against deals which include quantities of rag-content with shipments of sulphite.

The two-price structure in sulphite which had been expected seems beyond consideration on today's market. The supply of sulphite looks generally easier, and with increasing supplies of sulphite pulp in the offing as imports begin to flow again, a better quality product should result.

Newsprint

Following a recent release of the United Nations' report on the world's newsprint shortage and its conclusion that the marked inequality in newsprint distribution is inhibiting the flow of information to the public, came announcement from Charles E. Bohlen, State Department counselor, to the effect that while the shortage of newsprint is a serious handicap in combatting subversive propaganda, the United States has not advocated shipments of newsprint to Europe or to any other destination under the European Recovery Plan, even while it is recognized that the maintenance of a free press depends upon adequate supplies of newsprint.

The UN report showed that Canada is the only key country where newsprint production shows a current gain, most of which is exported to the United States, other customers receiving about the same as received in 1937. Exports to those countries for 1948 and 1949 are forecast to show a decline of over 100,000 metric tons as a result of dollar shortages. Germany, Japan and Korea are expected to remain out of the newsprint production for two more years because of idle capacity. The United Kingdom suffers most with its production at 32 percent of the prewar figures. Finland, Norway and Sweden are off somewhat in production as a result of droughts.

Despite the use of substitute fibers and deinked waste paper, no relief is indicated by the Secretariat of the United Nations as apparent in the world newsprint shortage.

Waste Paper

Prices of low bulky grades dipped again this week as supplies flowed in and mills continued to draw on inventories and to buy only in small amounts to supplement stocks. The market registers a soft tone, and the price of mixed is reported lower. Folded news dipped to a new low, and old corrugated, though less abundant, likewise recorded drops of two to three dollars. Ledgers and book also are softer with prices declining.

Higher grades are less abundant. Demand continues brisk and prices are maintained.

With the advent of the open season for collections and consequent further softening of prices on low bulky grades, concern is being expressed that the market may be weakened to a point which might discourage collections. A stable pricing system is being suggested to the industry as a contribution to the maintenance of a healthy supply and demand.

Cottons

Conditions in the new cuttings market are sustained at the quiet levels of the past weeks. Supplies peter in, and some are taken at quoted price levels though the mills are still able to take only for current needs or to draw on inventories. Consumer indifference is reported to the restricted supplies, and while some softening of prices seemed indicated, generally levels are maintained.

Old rag consumption likewise felt the impact of cautious buying at today's prices with the advent of good collection weather, and trading slowed down even on roofing stock, which hitherto had experienced brisk sale. Prices on No. 2 were reported as having dipped $3. Other grades are, however, unchanged.

Index

The index of general business activity for the week ended March 13 declined to 151.4 from 151.7 in the preceding week, compared with 146.1 in the corresponding week of 1947. Index of paperboard production was 187.3 compared with 192.5 in the preceding week and with 178.6 in the corresponding week of 1947.

Paper production for the week ended March 13 was estimated at 100.0 percent compared with 99.9 (revised figure) for the preceding week, with 107.2 for the corresponding week of 1947, with 104.1 for 1946, and with 89.4 for the corresponding week of 1945.

Paperboard production for the week ended March 13 was 102.0 percent of capacity, compared with 104.0 for the preceding week, with 104.0 percent for the corresponding week of 1947, with 100.0 for 1946, and with 95.0 for the corresponding week of 1945.

Miscellany

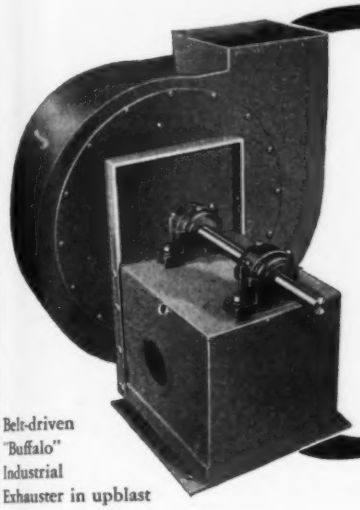
Possible uses of radioisotopes in papermaking processes are suggested for future research, according to a bulletin of the AP&PA which quotes from *Modern Industry* for February, 1948. "It is believed that radioisotopes may be used to help study process, control concentration of chemicals in pulp making, to follow waste water, to study pollution, and as static eliminators in calendar stacks. The article points out that special training and equipment are required to handle radioisotopes safely."

* * *

A year of forest fires in America is 169,356 "average fires" which burn enough potential newsprint to publish 100,000 copies of a 24-page daily paper for 350 years, according to information of the American Forest Products Industries in their bulletin "Keep America Green." "More Trees for My State" is in essence a nation-wide woods management project which this organization plans as an intensive program to produce more trees for America. Inquiries should be addressed to American Forest Products Industries, 1319 18th Street, N. W., Washington 6, D. C.

AIR EQUIPMENT TO HELP YOUR BUSINESS

MOVE MORE AIR
-OR MATERIALS



Belt-driven "Buffalo" Industrial Exhauster in upblast discharge position

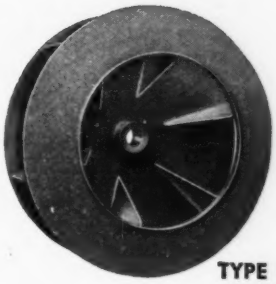
-at less cost with these "new Buffalo" Industrial Exhausters

NEW, HIGHER EFFICIENCIES!

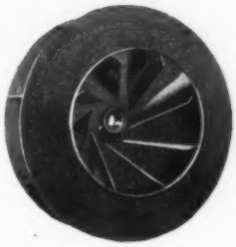
You get MORE EXHAUSTING FOR YOUR MONEY with the new "Buffalo" design! New all-welded housings and rotors give a smooth, rivetless surface . . . cut down resistance . . . give a stronger, lighter, more durable unit.

EXHAUST MATERIALS

Available with type "MW" Material Wheels, "Buffalo" Industrial Exhausters are used in the paper industries for moving any materials which a pneumatic system can handle.



TYPE "MW" MATERIAL WHEEL



TYPE "AW" AIR WHEEL

EXHAUST AIR, FUMES, VAPORS

"Buffalo" Industrial Exhausters are also available with type "AW" Air Wheels, for quiet, thorough removal of airborne dust, fumes, gases, etc.

● *Get better air moving for less money . . . get "Buffalo" Industrial Exhausters. Full data, yours on request. Bulletin No. 3576.*

BUFFALO FORGE COMPANY

159 MORTIMER STREET BUFFALO 4, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Branch Offices in all Principal Cities

FANS by "Buffalo"

EQUIPMENT FOR

- ★ VENTILATING
- ★ HEATING
- ★ COMFORT COOLING
- ★ PROCESS COOLING
- ★ AIR TEMPERING
- ★ AIR WASHING
- ★ EXHAUSTING
- ★ BLOWING
- ★ FORCED DRAFT
- ★ INDUCED DRAFT
- ★ PRESSURE BLOWING
- ★ CLEANING
- ★ DRYING

CUTTING AIR COSTS IN EVERY BRANCH OF INDUSTRY

Norwood Buyer Would Seek Local Financing

NORTHAMPTON, Mass.—A possibility was seen here this week for the reopening of the former Norwood Engineering Company, in Florence, makers of paper-making machinery, although representative citizens, assembled at the request of the Chamber of Commerce Industrial Development Committee, have turned down a proposition tendered to it by an industrial executive from New York.

Although no official statement was forthcoming from the representative citizens present, it was learned that the plan for the reopening of the concern involved the raising of about $100,000 to provide working capital for the new corporation to be formed.

It was reported to be the expressed opinion of the representative citizens at the gathering that $100,000 would be too large an amount to be raised among local citizens, who would receive stock at the rate of $1 a share. The remainder of the 200,000 shares of stock to be issued in the new concern would go partly in payment for the building and equipment and partly to the top executives and key men to be employed in the new corporation.

The citizens at the gathering, reported to include representatives of the city and the Florence Civic and Business Association in addition to members of the local Chamber of Commerce, are said to have advised the New York man to confer with the present owner of the buildings and equipment of Norwood Engineering, Abe Cooper of Watertown, N. Y., to ascertain if an alternate proposition to put the concern back into production cannot be worked out, which would include the plan to raise a total of not more than $50,000 locally.

The production manager for a New York industry is reported to have informed the local citizens at the meeting that if the plan were approved he would start operations in the Norwood plant almost immediately because the machinery has been kept oiled and ready for running. The New York man also stated that if he were able to carry out his plans, he would employ about 40 persons at the start of operations and that the personnel might eventually be increased to 125 workers, formerly employed.

It is understood that Mr. Cooper is ready to sell the Florence plant and its equipment, but that he has held up the sale of the plant or any of the equipment pending the outcome of the new negotiations, which could result in the reopening of the plant as a unit for the manufacture of items similar to those turned out by the Norwood Company.

The Chamber committee and other representative citizens will now await word from the conference slated for the near future between Mr. Cooper, the present owner of the Norwood plant, and the production manager for the large concern in New York, who is interested in heading up the new corporation to put the former Norwood concern back into operation.

Northeastern Council to Meet Sept. 17 at M.I.T.

NEW HAVEN, Conn. — The Northeastern Wood Utilization Council has made a preliminary announcement of a conference on bark, its chemistry and utilization, which will be held in Boston with the cooperation of the Massachusetts Institute of Technology on September 17th, 1948. The conference will include specialists on the chemistry and industry aspects of bark, with contributors from research institutions and industry. Developments in bark utilization from pulp and paper mills, as well as from sawmills and lumbering operations will be reviewed.

Attendance will be by invitation. Apply to Mr. E. L. Heermance, Secretary, New Haven 6, Connecticut.

Rolland Profits Doubled

TORONTO — Rolland Paper Company reports for 1947 a net profit of $330,734, or $4.30 a common share, representing an increase of almost 104 percent over $162,427 earned in the previous year. Balance sheet figures show current assets of $2,287,948 and current liabilities of $1,013,338, leaving net working capital of $1,274,610 against $1,337,201 a year ago.

why not let

pleasant odors

do a merchandising job for you?

Your paper—whether it be paperboard, gummed paper, wrapping paper, kraft paper, parchment paper—can profit by the use of

sindar aromatics

Especially blended for use in paper and paper products . . .

effective, easy-to-use, economical

Why not give your paper a better chance with a better odor? Ask us for further information, samples and prices.

SINDAR *Corporation*

Industrial Aromatics and Chemicals

330 West 42nd Street, New York 18, N. Y.

Branches: Philadelphia • Boston • Cincinnati • Detroit • Chicago • Seattle • Los Angeles • Montreal • Toronto

ST. REGIS PAPER COMPANY REPORTS ON 1947....

Sales and Earnings at New High

	1947	1946
NET SALES . . .	$143,864,583	$82,782,186
NET INCOME . .	14,631,325	5,563,603

Year in Review—

Assets: Have expanded to over $130,000,000.

New York Stock Exchange: Preferred and common shares of the Company listed June 16, 1947. Dividend payments on common stock resumed.

Timber Holdings: Increased to over 1,800,000 acres as a result of acquisitions in Maine and Georgia.

Mills and Plants: Total increased to 38. The Pensacola "Kraft Center" is nearing completion and will be the world's largest integrated operation of timber . . . to pulp . . . to kraft paper . . . to multiwall bags. Construction started on $6,000,000 Tacoma kraft mill.

Production Increased: Pulp production now 369,637 tons; paper production (all grades) now 506,255 tons; multiwall bag production now 190,508 tons. Capacity of Panelyte Plastics plant 25,000,000 pounds.

Employees: Have increased to over 13,000.

Stockholders: Now total over 15,000.

SUMMARY OF CONSOLIDATED INCOME FOR THE YEAR ENDED DECEMBER 31, 1947

Net Sales, Royalties and Rentals	$143,864,583.30
Cost of Sales and Expenses	120,445,637.30
Operating Income	23,418,946.00
Income Credits	1,343,654.32
Gross Income	24,762,600.32
Income Charges	678,458.53
Net Income Before Provision for Federal and Foreign Income Taxes	24,084,141.79
Provision for Federal and Foreign Income Taxes	9,325,458.19
Net Income Before Deduction of Minority Interests	14,758,683.60
Deduct Minority Interests in Income	127,358.11
Net Income	14,631,325.49

THE FUTURE

OUR program of expansion and modernization carried on through these recent years has now reached certain desired goals as disclosed by the above data.

Each unit has been strengthened through careful plant modernization, installation of new machines and the acquisition or construction of new plants. It will be our policy to continue these practices in the future to the extent needed to keep our Company abreast of its customers' requirements and to fulfill our responsibility to our employees.

Our products and markets are more diversified and we are continuing the development of new paper and plastic products. Multiwall bags for old and new customers are being produced in larger volume in our own factories from kraft paper of our own manufacture. All these factors are contributing to a greatly strengthened economic position for St. Regis.

In planning and carrying through the Company's expansion and improvement program, we have been prompted by our firm confidence in the sound future of the pulp and paper industry and the importance of its place in the American economy.

DIRECTORS

J. H. Allen	M. F. Ford	R. B. Maltby
T. H. Cosford	E. R. Gay	C. B. Martin
W. DeLong	H. R. Lamb	A. D. Pace
W. K. Dick	H. S. Lewis	J. A. Quinlan
W. J. Dixon	H. E. Machold	W. H. Versfelt
R. K. Ferguson	C. R. Mahaney	G. W. Wattles

ST. REGIS PAPER Company

230 PARK AVENUE, NEW YORK 17, N. Y.

NEW YORK · CHICAGO · BALTIMORE · SAN FRANCISCO

IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal

PRODUCTS: St. Regis "Tacoma" bleached and unbleached sulphate pulp . . . Multiwall Bags and Bag-filling Machines . . . Printing, Publication and Specialty Papers . . . Panelyte—the St. Regis Structural Laminated Plastic.

Kalamazoo Stages Coating Symposium

(Continued from page 12)

ing by Herman G. Rappolt, vice-president of the J. O. Ross Engineering Company, New York, and the second by A. A. Neese, mechanical engineer of the Beloit Iron Works, on winding.

The panel was composed of Norman I. Bearse, Champion-International Company; Kenneth W. Osborne, Ohio Boxboard Company; Charles Crow, Mead Corporation; and Richard Peeters, St. Regis Paper Company.

Thomas pointed out that calendering and super-calendering are purely mechanical operations. "The quality of the coating," he said, "depends upon the coating used and the paper itself, not on some external and hard to control factor."

He listed five variables in calendering: Speed, pressure, temperature, filled rolls and the relative diameters of metal and filled rolls, the latter in the super calendering operation. There is a definite limit, he said, on the amount of calendering and super calendering a web of paper can stand.

In that connection, he pointed out that tremendous strides have been made in the calendering of machine coated papers in recent years, giving much of the credit to various important paper-making contributions by technicians and engineers throughout the industry. A technical need that still exists, he said, is further development in the distribution of fibres in the paper itself.

The greatest advance in the practice has resulted from demands of the graphic arts industry for a more economical printing paper. To meet this demand supercalenders had to be designed that could maintain a production level set by the paper-making machines, he said. So calenders were designed that can carry heavier paper rolls that were sufficiently free from mechanical troubles to reduce "down time." Gains in hydraulic engineering and in electronics, he added, have been important factors in the advances made.

Single side coating, double coating and the problems of drying in both types were discussed in the afternoon by Rappolt. Coating board also came in for some technical discussion.

"There's a lot more to drying coated paper," he concluded, "than just blowing hot air on it. The dryer might be a complete failure if all the related elements are not properly coordinated. The mechanical end must be just right—uniform coating, synchronized speed of the various units, proper provision for splicing and starting new rolls, and so on. The raw stock is very important, especially with heavy coating. If the cross expansion is too great excessive lengthwise wrinkles will form. If the sheet is irregular, cockles or puckers will form and if the sizing is too great the wet and dry curls may cause serious trouble.

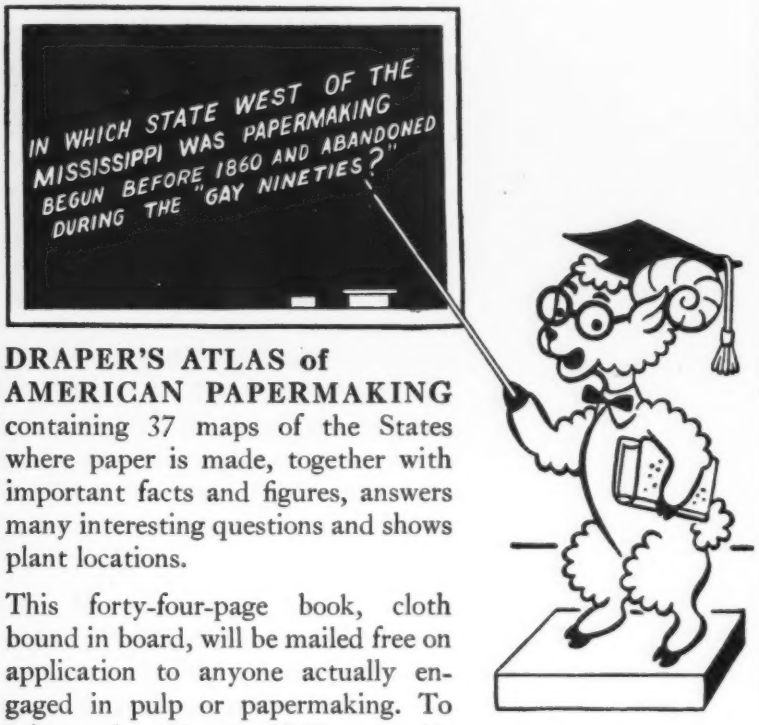
"The coating mix must be made with the maximum sizing for good bond at the high temperatures and the highest solids content consistent with good spread of coating. If starch is used the drying speed may be one-third greater than with casein for the same weight of coating.

"In addition to the skill of the workers, there must also be a desire or will on the part of experienced operating men to make the coating operation run smoothly. Without this all-round team work, hot air is useless."

Bulkley, Dunton to Distribute Rochester Blotting Papers

NEW YORK — The appointment of Bulkley, Dunton & Company, Inc., as exclusive distributors of Rochester Indian Blottings in the New York Metropolitan and in the New Haven, Conn., areas was announced jointly by Paul H. Travis, President of Rochester Paper Company and J. C. Marvin, Vice President of Bulkley, Dunton & Co., Inc. Messrs. Travis and Marvin also announced that Carter, Rice & Co. Corporation, Bulkley, Dunton's wholly owned subsidiary, will act as exclusive distributors for the same line in the New England states, except in New Haven.

What do you know about Paper?



DRAPER'S ATLAS of AMERICAN PAPERMAKING containing 37 maps of the States where paper is made, together with important facts and figures, answers many interesting questions and shows plant locations.

This forty-four-page book, cloth bound in board, will be mailed free on application to anyone actually engaged in pulp or papermaking. To others, the price is $2.00 postpaid, while the edition lasts.

The DRAPER Felt

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASSACHUSETTS

Ralph E. Briggs, *Sales Manager*

BRADFORD WEST, Pittsfield, Mass. — WILLIAM N. CONNOR, Jr., Canton, Mass. — L. H. BREYFOGLE, Kalamazoo, Mich.

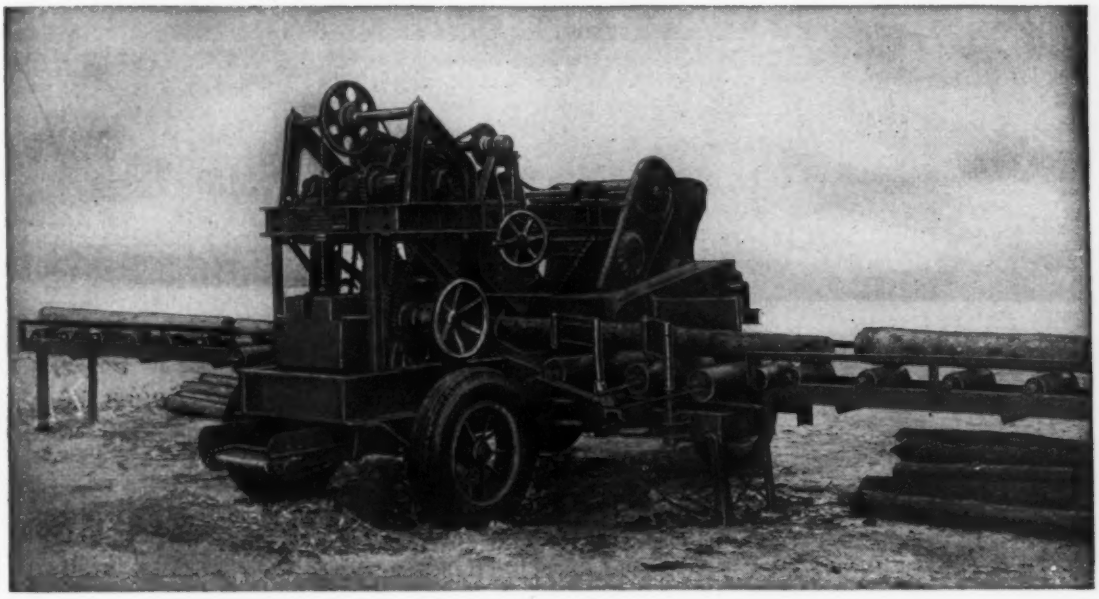
WALTER A. SALMONSON, 519-20 White Bldg., Seattle, Wash. — L. L. GRIFFITHS, Jr., Kalamazoo, Mich.

Answer to Question No. 3 In the State of Utah

Peel your pulpwood the new way with

Nekoosa Portable Wood Peeler

... Save manpower ... Save freight ... Save money



THE Nekoosa Portable Wood Peeler will clean practically all species of pulpwood in diameters from 3 to 12". It handles hard woods exceptionally well.

The removal of bark in the woods cuts freight costs and means a better scale—The Nekoosa Portable Wood Peeler cuts labor costs. Five men have actually peeled 6 cord per hour using this machine.

Post treaters are also using this equipment for peeling fence posts prior to treating.

Ask us for additional information.

Nekoosa Foundry & Machine Works Inc.

Nekoosa, Wis.

Other Products

Bark Press	Chip Cutter	Washers
Flat Screens	Agitators	Digester Fittings
Ball Valves	Deckers	Press Marking Equipment

1. FOR THE MONEY As a base material for making fine cotton content paper, Rayco is your best buy in linter cotton.

2. FOR THE SHOW You can *see* the difference in quality between clean, carefully graded and inspected Rayco and ordinary linter cotton.

3. TO MAKE READY Rayco requires no rag room operations because it comes to you free of impurities, dyes, synthetics, knots and weavings.

4. TO GO Cooker-ready Rayco can help you speed production and lower costs. Get in touch with us. A Railway specialist will gladly visit your plant and show you how and why Rayco Linter Cotton makes fine cotton content paper.

The RAILWAY SUPPLY & MFG. CO. and Affiliates

Specialists in Grading, Marketing and Processing Cotton Fibers

General Offices: CINCINNATI, OHIO

New York • Chicago • Memphis • Dallas
Detroit • Atlanta • Charlotte

RAYCO
LINTER COTTON

Norton Co. Discloses New Grinding Wheel

WORCESTER, Mass.—A new type of grinding wheel has been previewed by Norton Company, at the opening of the Tool Engineers' Industrial Exposition in Cleveland. The exposition is sponsored by the American Society of Tool Engineers.

Prominent in the Norton exhibit at the show, this new development is a reinforced, resinoid-bonded cut-off wheel trade-marked Norflex and is demonstrated on a high-speed cutting-off machine widely used in foundries.

High strength and flexibility are combined in this product to provide a margin of safety greater than in any other wheel of this type previously produced, a company spokesman said.

The strength of the new wheel is demonstrated by a novel testing device resembling the "Test Your Strength" machines seen at amusement parks and county fairs. Visitors to the booth are invited to try their skill and prove the unusually heave pressures required to fracture the wheel.

Tests indicate that forces of 250 to 300 pounds are necessary to break the Norflex wheel.

Another new product of Norton research previewed at the show is a ceramic surface plate never before made available in this type of composition. The plate is designed for use in toolrooms and inspection departments where precision setups and checking measurements require the highest degree of accuracy.

A striking feature of the Norton exhibit is a display of the 32 Alundum abrasive grinding wheels introduced a year ago. These wheels are being demonstrated on a surface grinder.

The exhibit also includes a general display of Norton refractories products, Alundum tumbling abrasive, polishing grain, and Norbide gages of various types. Norbide is the trademark for Norton boron carbide.

Irving W. Stanton, Norton exhibition engineer, is in charge of the display.

IPI To Build New Plant On New Jersey Site

ELIZABETH, N. J.—International Printing Ink Division of Interchemical Corporation has awarded a contract for construction of a new 158,000 square foot plant in Elizabeth, for the production facilities of IPI inks. The company now operates three production units in the New York City area which will be consolidated in the new plant. Site of the building is a part of the 43 acre tract recently acquired by Interchemical Corporation from Central Railroad of New Jersey. The structure has been especially designed for making printing inks and when completed will house the most modern manufacturing facilities.

Brown School Ups Student Capacity

PHILADELPHIA—Student capacity, space, and equipment facilities at the Brown School of Instrumentation has been doubled through the leasing of new and larger quarters consisting of a four-story building. The school now in its 14th year, is conducted for training both customer and Brown Instrument Company service and maintenance engineers. The new quarters will permit expansion of the school faculty under direction of M. L. Ladden, according to L. M. Morley, vice-president of Minneapolis-Honeywell Regulator Company and its Brown division. It will also permit, he added, a reduction in the large backlog of applications from Brown customers who wish to provide their instrument engineers with additional technical and practical knowledge of industrial instrument operation and maintenance.

The school will extend its courses in processing control and will add classes for the teaching of specialized subjects. Free tuition is provided for customer students, who come to the school from all corners of the world.

The new school, at 5109 Germantown avenue, is on the site where in 1688 the first recorded protest was heard in North America against human slavery. The first three floors of the school will include school offices, lecture halls, exhibit equipment workroom, laboratories, demonstration panels, work rooms, etc. The fourth floor will be equipped with complete panel layouts of Brown instruments as applied to various process controls and with Minneapolis-Honeywell non-indicating or recording devices.

OBITUARY

Worden A. Shove

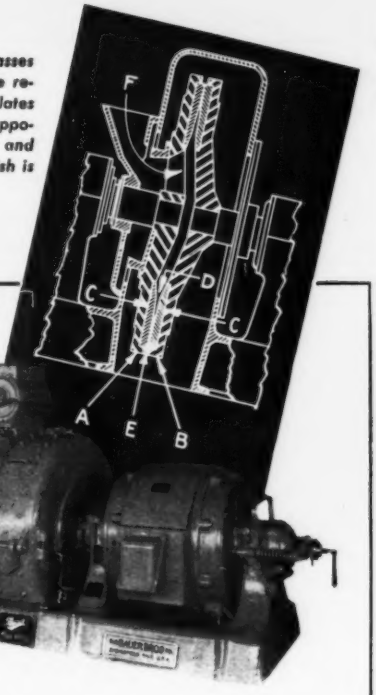
APPLETON, Wis.—Worden A. Shove, 57, power superintendent of Riverside Paper Corporation for the last 15 years, died at his home March 15, after an illness of several months. He had been employed by the company for 30 years.

He was a graduate of the Milwaukee School of Engineering. He was a member of the Fidelity chapter of the Eastern Star No. 94, of Waverly Masonic lodge and of Trinity Lutheran church.

Funeral services were conducted here March 17. Burial was at Waukau, Wis.

William H. Smith

HOLYOKE, Mass.—William H. Smith, 88, proprietor of a paper manufacturers' supply agency, died March 14. Before going into business for himself, he had for many years been employed by Parsons Paper Company and later by Syms-Dudley Paper Company, both of Holyoke.



Pulp enters at "F," passes along "DE" between the renewable fiberizing plates "C," attached to the oppositely rotating discs "A" and "B," and prepared furnish is discharged at "E".

AN EXCELLENT SHEET OUT OF 100% HARD WOOD

SAVINGS ON FURNISH IMPRESSIVE

Mills processing hard wood sulphite in lieu of spruce sulphite are installing Bauer pulpers—and with notable results.

Hard wood sources, heretofore neglected, now being tapped. Organic dirt dispersal up to 90%, resulting in far greater cleanliness.

High freeness being maintained.

No cutting, but good formation and noticeable increase in strength.

The above listed benefits are impressive, especially at mills with plenty of hard wood available, where savings of several dollars per ton of furnish are being realized.

BAUER PULPERS also standard equipment for pulping of screenings and rejects.

THE BAUER BROS. CO.
SPRINGFIELD, OHIO

pulp whitening

PQ SILICATES AID PULP WHITENING

More and better paper always starts with whiter, cleaner pulp. And PQ Silicate assistance starts there too. Leading mills that bleach groundwood pulp rely on PQ Silicate to stabilize the peroxide solutions. PQ's recognized uniform quality secures top benefits from the peroxide. In hypochlorite bleaching, also, the use of PQ Silicate increases brightness. Successful de-inking formulae regularly specify PQ Silicate for these important advantages:

wetting properties
deflocculating of solid dirt
suspending of removed dirt

Know how PQ Silicates can improve your products or your profits. Ask for Bulletin No. 17-1 which describes the properties and uses of PQ Silicates.

PHILADELPHIA QUARTZ CO.
121 S. Third St., Dept. B, Philadelphia 6, Pa.

PQ WORKS:

ANDERSON, IND.
BALTIMORE, MD.
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JEFFERSONVILLE, IND.
KANSAS CITY, KANS.
RAHWAY, N. J.
ST. LOUIS, MO.
UTICA, ILL.

PRICES

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume business still is being done under contract at the figures given below, fluctuations representing special conditions are to varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—
Rolls, contract .... $93.00/$96.00
Sheets 102.50/109.00

Kraft—per cwt.—Carload Quantities Zone A Deld. 40 lb. base wgt.

Superstandard Wrapping	$9.00/	—
No. 1 Wrapping	7.25/	8.00
Standard Wrapping	6.50/	—
Standard Bag	6.50/	—

Tissues—Per Ream 24x36 (480) 11 lb. Zone 1.

Wh. No. 1 Frd.	$1.84/	$2.00
Wh. No. 1 M. G.	1.94/	2.00
Wh. No. 1½	1.60/	—
Wh. No. 2	1.75/	—
Kraft Anti-Tar	1.65/	—
Kraft Unbl.	1.85/	—
Manila No. 2	1.62/	—
Shred. Wh. No. 1 cwt.	1.10/	1.50

Toilet—Per Case of 100 rolls—1 M Sheets.

Unbleached	$8.50/	$10.00
Bleached	8.50/	10.00

Paper Towels—Per Case of 3750—Zone 1.

Wh. Jr. M'tif'd 9¼x9½	$5.15
Br. Sr. M'tif'd 10x12	3.60
Br. Jr. M'tif'd 9½x9¾	3.10
Br. Jr. Sgl. fold 10x10¾	3.15

Manila—per cwt.—C-l. f.a.

No. 1 Jute Tag	$14.50/	—
Reg. Jute Manila	13.25/	$15.50
No. 1 Manila	9.75/	—

Boards, per ton—

Plain News	$92.50/	—
Filled News	94.00/	—
Plain Chip	90.00/	—
Sgl. Mla. J-d. Chip*	100.00/	102.50
White Pat. coated*	120.00/	—
Kraft Liners 42 lb.	100.00/	—
Kraft Corr. .009	105.00/	—
Binders Boards	126.00/	—

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1; Rag Content Bonds and Ledgers—

White, Assorted Items
Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$55.00	$50.80	$48.70
100% Rag	48.25	44.55	42.70
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Ledgers, per cwt.

100% Rag Ext. No. 1	$55.00	$50.80	$48.70
100% Rag	48.25	44.55	42.70
75% Rag	37.50	34.55	33.10
50% Rag	32.25	29.40	28.25
25% Rag	28.75	26.15	25.10

Sulphite Bonds and Ledgers—
White, Assorted Items
Bonds, per cwt.

No. 1	$21.25	$19.25	$18.50
No. 2	20.25	18.30	17.55
No. 4	19.25	17.55	16.85

Ledgers, per cwt.

No. 1	$21.75	$19.65	$18.85
No. 2	20.75	18.75	18.05
No. 4	20.00	18.10	17.35

Free Sheet Book Papers—
White, Cased Paper

(Per cwt.)	Case	Ton
No. 1 Glossy Coated	20.40	$19.50
No. 2 Glossy Coated	19.15	18.30
No. 3 Glossy Coated	18.40	17.60
(Per cwt.)	Case	Ton
No. 1 Antique (Watermarked)	$15.90	$15.15
No. 2 Offset	15.15 to 17.90	14.60 to 17.10
A Grade E. F.	14.90	14.25
A Grade S. & S. C.	15.40	14.65
B Grade E. F.	13.90	13.30
B Grade S. C.	14.40	13.70

Wood Pulp

Domestic mill contract prices delievered with varying freight allowances.

	Per Short ADT
Groundwood	$80.00/$81.00
Unbleached Sulphite	124.00/ —
Bleached Sulphite	125.00/135.00
Bleached Soda	130.00/ —
Bleached Sulphate	175.00/185.00
Unbleached Sulphate Northern	125.00/155.00
Unbleached Sulphate Southern	130.00/145.00

Canadian Quotations

Prices delivered with varying freight allowances unless otherwise specified:

	Per Short ADT
Reg. No. Kraft	125.00/ —
Unbleached Sulphite	125.00/126.00
Bleached Sulphite	125.00/135.00
Glassine Unbleached Sulphite (no freight allowance)	120.00/ —
Bleached Soda	130.00/ —
Groundwood	80.00/ 85.00
Sideruns Pulping News	80.00/ —
Hardwood and Specialty Grades	Nominal

Swedish Quotations

On dock, Atlantic Ports

	Per Short ADT
Bleached Kraft	175.00/185.00
Bleached Sulphite	175.00/185.00
Unbleached Sulphite	145.00/175.00
Unbleached Kraft	140.00/165.00

Finnish Quotations

On dock, Atlantic Ports

	Per Short ADT
Bleached Sulphite	$185.00/ —
Unbleached Sulphite	155.00/157.00
Unbleached Sulphate	147.50/ —

New Domestic Cotton Cuttings

(F.O.B. Shipping Point Plus Dealer's Commision)

White Shirt	$12.00/$12.50
Unbleached Muslin	12.00/ 12.50
Light Silesias	9.00/ 9.25
White Back Blue Overalls	9.00/ 9.50
Blue Overalls	8.00/ 8.25
Fancy Shirt	6.00/ 6.25
Light Percales	8.50/ 8.75
Light Prints	7.50/ 7.75
No. 1 Washables	5.00/ 5.25
Bleachable Khaki	7.50/ 8.00
Unbleachable Khaki	6.50/ 7.00
Cottonades	5.50/ 5.75

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.	
No. 1 Whites Repacked	$5.50/	$6.00
No. 1 Whites Miscellaneous	4.50/	5.00
No. 2 Whites Repacked	3.50/	3.75
No. 2 Whites Miscellaneous	3.00/	3.50
Blue Overalls	3.75/	4.00
Thirds and Blues Repacked	3.25/	3.50
No. 1 Roofing Rags	2.10/	2.15
No. 2 Roofing Rags	1.90/	2.00
No. 3 Jute Bagging	1.75/	1.85
No. 4 Brussels and hard back carpets	1.75/	1.85
No. 5A Roofing Rags	1.75/	1.85

New Foreign Cotton Cuttings

(Prices to Mill, F.O.B. Dock, N.Y.)

	Per 100 lbs.	
New Dark Cuttings	$5.50/	$5.75
New Mixed Cuttings	6.25/	6.50
Light Silesias	9.25/	9.50
Light Flannelettes	9.25/	9.50
New White Cuttings	12.00/	13.00
New Unbleached Cuttings	12.25/	13.00
Fancy Shirt Cuttings	6.50/	7.00
Light Prints	7.75/	8.00
Bleachable Khaki, No. 1	7.00/	7.50
Unbl. Khaki, No. 1	6.25/	6.75

Old Foreign Rags

(Prices to Mill, f.o.b. dock, N.Y.)

	Per 100 lbs.	
No. 1 White Linens	$14.00/	$16.00
No. 2 White Linens	12.00/	13.00
No. 3 White Linens	8.00/	9.00
No. 4 White Linens	8.00/	9.00
No. 1 White Cottons	8.00/	10.00
No. 2 White Cottons	7.00/	8.00
No. 3 White Cottons	6.00/	6.50
No. 4 White Cottons	4.00/	4.50
Extra Light Prints	6.50/	7.00
Old Light Prints	4.50/	5.00
Med. Light Prints	4.00/	4.50
Dutch Blue Cottons	5.25/	5.50
Checks and Blues	4.00/	4.25
Linsey Garments	2.60/	2.75
Dark Cottons, European	2.50/	2.60
Dark Cottons, Egyptian	3.00/	3.25
Old Shopperies	2.20/	2.30
New Shopperies	2.40/	2.50

Bagging

(Prices to Mill, f.o.b. N.Y.)

	Per 100 lbs.	
Foreign Gunny, No. 1	$6.00/	$6.50
Domestic Gunny, No. 1	6.25/	6.50
Light Wool Tares	6.25/	6.50
Heavy Wool Tares	6.00/	6.25
No. 1 Scrap Bagging	5.50/	5.75
Roofing Bagging	2.00/	2.25
Foreign Manila Rope	6.00/	6.75
Domestic Manila Rope	6.50/	6.75
Jute Strings	5.00/	5.25
No. 1 Sisal Strings	5.25/	5.50
Mixed Strings	1.75/	2.50

Waste Paper

Base Prices to Mills for Average Packings
(Dollars Per Ton)
F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	$155.00/$165.00
No. 1 Hard White Envelope Cuts	145.00/ 155.00
No. 1 Hard White Shavings, unruled	145.00/ 155.00
No. 1 Hard White Shavings, ruled	110.00/ 130.00
Soft White Shavings, one cut	145.00/ 155.00
No. 1 Soft White Shavings	135.00/ 145.00
Soft White Shavings, Misc.	125.00/ 135.00
No. 1 Fly Leaf Shavings	45.00/ —
No. 1 Groundwood Fly Leaf Shavings	35.00/ —
N. 1 Heavy Books & Magazines	25.00/ 26.00
Mixed Books	15.00/ 18.00
No. 1 White Ledger	80.00/ 85.00
Manila Tab. Cards	9.50/ 11.00
New Manila Envelope Cuttings, one cut	100.00/ 110.00
New Manila Envelope Cuttings	65.00/ 75.00
Extra Manilas	25.00/ 30.00
Mixed Kraft, Env. & Rag Cuttings	75.00/ 85.00
Kraft Envelope Cuttings	110.00/ —
Triple Sorted, No. 1 Brown Soft Kraft	65.00/ 75.00
New Kraft Corrugated Cuttings	75.00/ 80.00
No. 1 Assorted Old Kraft	50.00/ 55.00
New Jute Corrugated Cuttings	27.00/ —
Old 100% Kraft Corrugated Containers	45.00/ 50.00
No. 1 News	15.00/ 16.00
No. 1 Mixed Papers	10.00/ 12.00
Box Board Cuttings	— / —
White Blank News	75.00/ 85.00
Overisue News	23.00/ 24.00
Old Corrugated	23.00/ 25.00
Mill Wrappers	22.00/ 24.00

Twines

All Prices Nominal, F.o.b. Mill

(Soft Fiber)

Coarse Polished— India	.33¾/	.35
Fine India	.38¾/	.42½
Fine Polished		
Unpolished— Paper Makers	.28¾/	.30¾
Tube Rope	.29 /	.31½
Wrapping	.32 /	.35¼
Cotton	.63¼/	.66¾

(Hard Fiber)

Mex. Sisal	.21 /	.27
Manila (Reprocessed)	.30 /	.32

(American Hemp)

Polished Hemp	.36¾/	.60
Unpolished	.32¼/	.54

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings— New White No. 1	.11 / .12
New White No. 2	nominal
Light Silesias	.07½/ .08
Black Silesias, soft	.06½/ .07
New Unbleached	.10½/ .11¼
Washable Prints	.06½/ .07
Washable No. 1	.05 / .05½
Blue Overall	.07½/ .08
Cotons—According to grades— Washable Shredding	.03½/ .04
Fancy Percales	.06¾/ .07¼
New Black Soft	nominal
Khaki Cuttings— Unbleachable Cotton Cuttings	.06 / .06½
Bleachable Cotton Cuttings	.07 / .07½
Men's Corduroy	.05½/ .06
Ladies' Corduroy	.05 / .05½
Cottonades	.05½/ .06

Domestic Rags (Old)

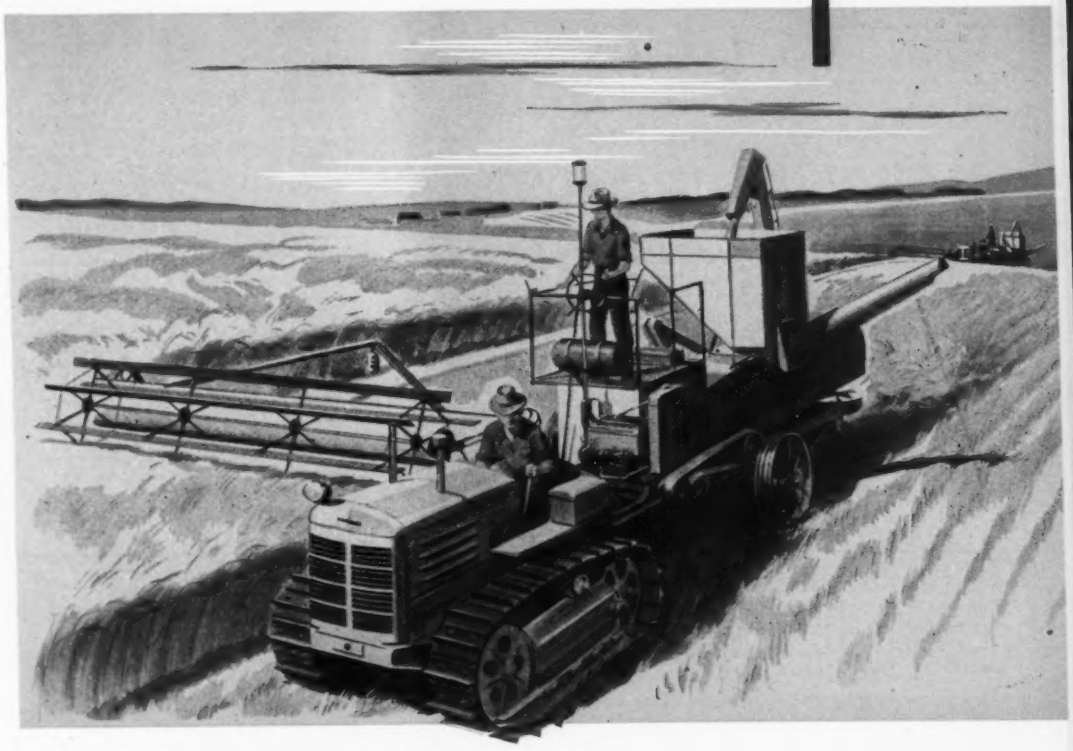
(F.O.B. Eastern Shipping Point)

White No. 1 —Repacked	4.50 / 5.00
Mixed White	4.00 / 4.25
White No. 2—Repacked	3.50 / 3.75
Thirds and Blues— Miscellaneous	2.25 / 2.50
Repacked	2.75 / 3.00
Roofing Stock— Foreign No. 1	nominal
Domestic No. 1	1.85 / 1.90
Domestic No. 2	1.75 / 1.80
Roofing Bagging	1.65 / 1.70
Old Manila Rope	6.25 / 6.50

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1— Foreign	nominal
Domestic	4.75 / 5.25
No. 1 Clean Bright— Sisal Strings	.04½/ .05
No. 2 Clean Bright— Sisal Strings	.03½/ .04
Sisal Jute	.02¼/ .03
Scrap— No. 1	5.00 / 5.50
No. 2	2.50 / 3.00



it looks easy...now

As you watch a huge modern harvester-thresher at work you are impressed with the speed and efficiency of its performance. But behind this performance are decades of pioneer effort and painstaking development. This is true of practically all modern industrial achievements. It is true of modern electro-chemical products, many of which were produced for the first time in this country by Niagara Alkali Company and groomed to amazingly accurate standards of quality, uniformity and efficiency by continuous pioneering research on the part of Niagara. This pioneering has made Niagara "An Essential Part of America's Great Chemical Enterprise."

NIAGARA ALKALI COMPANY

60 East 42nd Street, New York 17, N.Y.

LIQUID CHLORINE • CAUSTIC POTASH • CARBONATE OF POTASH • PARADICHLOROBENZENE • CAUSTIC SODA • NIAGATHAL (TETRACHLORO PHTHALIC ANHYDRIDE)

Wol Tares, heavy ..	4.75	/ 5.00
New Burlap Cuttings	6.00	/ 6.50

Old Papers

(F. o. b. Phila.)
Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00/$115.00	
No. 1 Hard White Shavings, unruled .	100.00/	—
Soft White Shavings, One cut	90.00/	95.00
White Blank News .	75.00/	—
Soft White Shavings	80.00/	—
No. 1 White Ledger	85.00/	90.00
Ledger, Colored	70.00/	72.00
No. 1 Heavy Books & Magazines	24.00/	26.00
Overissue Magazines	nominal	
New Manila Envelope Cuttings	80.00/	—
No. 1 Assorted Old Kraft	60.00/	65.00
No. 1 Mixed Paper .	11.00/	12.00
Box Board Cuttings .	10.00/	11.00
Kraft Corrugated Cuttings	90.00/	100.00
Old Corrugated	24.00/	26.00
Overissue News	20.00/	22.00
No. 1 News	13.00/	15.00

BOSTON

Old Papers

(F. o. b. Boston)
Mill Prices, Baled

No. 1 Hard White Shavings, unruled .	6.25	/ 6.75
No. 1 Hard White Shavings, ruled ..	6.00	/ 6.50
Soft White Shavings, Misc.	6.00	/ 6.25
No. 1 Fly Leaf Shavings	—	/ —
No. 2 Fly Leaf Shavings	4.25	/ —
No. 1 Groundwood Fly Leaf Shavings	1.75	/ 2.00
No. 2 Groundwood Fly Leaf Shavings	1.50	/ 1.75
Mixed Colored Shavings	2.00	/ 2.25
New Manila Envelope Cuts, one cut	4.50	/ 4.75
Hard White Envelope Cuts, one cut	7.00	/ —
Triple Sorted No. 1 Brown Soft Kraft	3.75	/ 4.00
Mixed Kraft Env. & Bag Cuttings	4.00	/ 4.25
Kraft Envelope Cuttings	3.75	/ 4.00
No. 1 Heavy Books & Magazines	1.75	/ —
New Manila Envelope Cuttings, one cut .	—	/ —
New Manila Envelope Cutings	4.00	/ 4.25
White Tabulating Cards	5.00	/ —
Groundwood Tabulating Cards	1.50	/ 1.75
White Blank News .	2.25	/ 2.50
No. 1 Assorted Old Kraft	3.50	/ 4.00
No. 1 Mixed Paper .	.60	/ .65
Overissue News	.90	/ 1.00
No. 1 News	.70	/ .75
Box Board Cuttings .	.60	/ .70
New Corrugated Cuttings, Kraft	2.75	/ 3.00
Old Kraft Corrugated Containers ..	2.50	/ —
Old Corrugated Containers	1.25	/ 1.30
Jute Corrugated Cuttings	1.07½/	—
Paper Strings	2.00	/ 2.25

Bagging

(F. o. b. Boston)

Gunny Bagging—		
Foreign	—	/ 4.75
Domestic	—	/ 4.75
Sisal Rope No. 1 ..	6.00	/ —
Sisal Rope, No. 2 ..	5.50	/ —
Mixed Rope	5.25	/ —
Mixed Strings	2.00	/ 2.50
Transmision Rope—		
Foreign	nominal	
Domestic	3.00	/ 3.50
Manila Rope—		
Foreign	nominal	
Domestic	6.25	/ —
Soft Jute Rope	5.00	/ 5.25
Jute Carpet Threads	6.00	/ —
Bleachery Burlap	8.50	/ 9.00
Scrap Burlap—		
Foreign	—	/ 4.75
Domestic	—	/ 4.87½
South America	5.25	/ —
Wool Tares		
Foreign	4.75	/ —
Domestic	4.75	/ —
Asst. Wool Pouches .	5.00	/ 5.25
New Zealand Wool Pouches	5.25	/ 5.50
New Burlap Cuttings	6.00	/ 6.50
Heavy Baling Bagging	5.25	/ 5.75
Paper Mill Bagging .	3.50	/ 3.75
No. 1 Roofing Bagging	1.75	/ —

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—		
New Light Prints .	.07½/	—
Fancy Percales ..	.08	/ —
New White No. 1 .	.11	/ .11¼
New Light Flannelettes	.08	/ .08½
Canton Flannels, Bleached	.10	/ .11
Underwear Cutters, Bleached	.11¼/	—
Underwear Cutters, Unbleached	.11	/ .12
Silesias No. 1	.08	/ .08½
New Black Silesias .	.04½/	—
Red Cotton Cuttings	.05	/ —
Blue Overalls	—	/ .08½
Soft Unbleached	.11	/ .12
Blue Cheviots	.08½/	.09
Fancy	.06	/ —
Washable	.06	/ —
Khaki Cuttings	.06½/	.07½
Corduroy	.03½/	—
Men's Corduroy	.04½/	—
Ladies' Corduroy	.04	/ —
Khaki Canvas	—	/ .06
B. V. D. Cuttings	.11½/	—

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—		
Repacked	3.80	/ —
Miscellaneous	3.20	/ —
White No. 2—		
Miscellaneous	2.65	/ —
Twos and Blues, Repacked	2.20	/ —
Old Blue Overalls ..	2.25	/ 2.50
Thirds and Blues, Repacked	2.20	/ —
Miscellaneous	1.80	/ —
Black Stockings	3.50	/ 4.00
Roofing Stock—		
No. 1	1.85	/ —
No. 2	1.75	/ —
No. 3	1.65	/ —
No. 4	1.65	/ —
No. 5, Quality A.	1.35	/ —
Quality B.	1.20	/ —
Quality C.	.95	/ —
Old Manila Rope	6.00	/ —

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)
Mill Prices, Baled

Shavings—		
No. 1 Hard White Envelope Cuts, one cut	$150.00/	—
No. 1 Hard White Shavings, runruled	140.00/	—
No. 1 Soft White Shavings	120.00/	—
No. 1 White Ledger .	85.00/	—
No. 1 Heavy Books & Magazines	35.00/	—
White Blank News .	80.00/	85.00
Mixed Kraft Env. & Bag Cuttings	90.00/	110.00
No. 1 Assorted Old Kraft	35.00/	—
Overissue News	24.00/	—
No. 1 News	21.00/	—
No. 1 Mixed Paper .	13.00/	—
Old Corrugated	26.00/	—
Mill Wrappers	17.00/	—

MARKETS

BLANC FIXE—Demand continues strong. Prices firm. Pulp is currently quoted at $85 in bags, car lots at works, 6 cents per lb., l.c.l., deld.; by-product $75 per ton, car lots at works, 6 cents per lb., l.c.l., deld.

BLEACHING POWDER—Supply improves. Shortage of shipping container a delivery problem. Prices range from $3.75 to $4 per 100 pound drums, l.c.l. works.

CASEIN — Pronounced inactivity characterizes market. Prices sag. Current prices on processed acid precipitated casein at 32 to 34 cents per pound for domestic grades and 27½ to 29 cents for imported grades, f.o.b. shipping point.

CAUSTIC SODA—Capacity production unequal to increasing demand. Restrictions on export resale price and new output should reduce problem this year. Tank car shortage critical. Solid caustic is reported at $2.85 per cwt.; flaked and ground is quoted at $3.25 per cwt. in 400 pound drums, $3.75 per cwt. in 100 pound drums—car lots at works; liquid 50 percent in tank cars at $2.25 per cwt.; liquid 73 percent in tank cars at $2.35 per cwt. at works.

CHINA CLAY—Domestic grades and imported in good supply. Filled is $9 to $11.50 per ton, car lots; coating clay is $14 to $22. Imported clay quotation, short tons, $16 to $35, export warehouse.

CHLORINE—Spot easing in tank-car stocks in some sections. Pacific supply good. Demand easier. Currently quoted at $2.25 per cwt. in single unit tank cars, at $2.55 to $3.75 per cwt. in multi-unit tank cars, f.o.b. works.

ROSIN—Market inactive. Gum rosin in drums per 100 pounds net in yard. New York car lots. B, $9.05; D, $9.25; E, F, G, H, I, K, M, N, $9.35; WG, $9.85; WW, $9.95; wood rosin, per 100 pounds, net, f.o.b., l.c.l., N. Y., B, $6.45; FF, $7.95; G, H, I, K, M, $9.18; N, $9.30; WG, $9.92; WW, $10.02; X, $10.12.

SALT CAKE—Demand continues ahead of supply with slight improvement in shipments. Prices unchanged. Domestic salt cake is quoted at $20 to $26.

SODA ASH — No easing of strong demand and tight supply. Shipments only against contracts. Current prices, car lots, per 100 pounds; in bulk, $1.10; in paper bags, $1.30; and in barrels, $1.70.

SODIUM BICARBONATE — Supply improved. Shortage of box cars delays shipment. Reported as $1.85 per cwt. paper bags, carload lots.

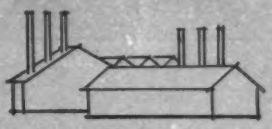
STARCH — Demand regular. Supply plentiful. Pearl grade quoted at $6.96 per 100 pounds; powdered starch at $7.07 per 100 pounds; car lots, New York.

SULPHATE OF ALUMINA—Prices unchanged. Supply steady. The commercial grades are quoted at from $1.15 to $1.30 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is $2 per 100 pounds in bags, car lots, at works.

SULPHUR—Supplies ample. Prices unchanged. Annual contracts are quoted at $16 to $18 per long ton, f.o.b. mines; the price f.o.b. at Gulf ports is $17.50 to $19.50 per long ton.

TALC — No change in domestic market. Demand far in excess of supply. Domestic grades are currently quoted at $21 per ton in mines; Canadian at $35 and up per ton. All prices in car lots.

TITANIUM DIOXIDE—Extremely tight supply with no early easing seen. Shipments on allocation. Anastase 17½c lb. carload lots, 18-18½c l.c.l., rutile, 19½c lb. carload lots, 20-20½c l.c.l.; 50-lb. bags, f.o.b. plant, minimum freight allowance.



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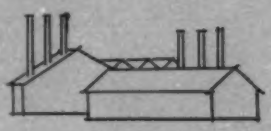

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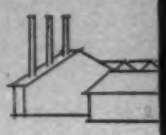

HERCULES **size**

Those new paper mills springing up around the country are the last word in engineering, machinery, and technology. While one new plant may differ slightly from another, collectively they indicate the trend to Hercules size in today's papermaking. A new paper mill deserves the *best*. That's why the modern trend is to Hercules size—a quality product backed by helpful technical service.

HERCULES

SIZING MATERIALS AND CHEMICALS FOR PAPER

HERCULES POWDER COMPANY

961 King Street, Wilmington 99, Delaware

PPS-1

IMPORTS

WALLPAPER

K. Johnson, Mormacfir, Gothenburg, 1 pcl.

FILTER PAPER

H. Reeve Angel & Co., Inc., Augustana Victory, Liverpool, 15 cs.

GUMMED PAPER

B. F. Drakenfeld & Co., Fort Spokane, Liverpool, 26 cs.

PHOTO PAPER

(———), Augustana Victory, Antwerp, 3 cs.

TRANSPARENT PAPER

Rohner Gehrig & Co., Washington, Southampton, 1 cs.

KRAFT PAPER

Cellulose Sales Co., Mormacfir, Gothenburg, 64 rolls.

PAPER SERVIETTES

Gimbel Bros., Fort Spokane, Liverpool, 1 cs. (crepe).

(———), Fort Spokane, Liverpool, 11 cs. (crepe).

MISCELLANEOUS PAPER

Sterling National Bank Trust Co., Mormacfir, Gothenburg, 76 rolls.

RAGS, BAGGINGS, ETC.

Tasto Products Trading Co., Marseilles, Naples, 155 bls. old dark cotton rags.

New England Waste Co., Escanaba Victory, Madras, 325 bls. cotton waste.

Manufacturers Trust Co., Ames Victory, Antwerp, 113 bls. jute waste, 105 bls. jute card waste.

Continental Bank Trust Co., Ames Victory, Antwerp, 102 bls. old scrap bagging.

Brandwein Mazur Co., Steel Seafarer, Bombay, 400 bls. cotton waste.

(———), Steel Seafarer, Bombay, 100 bls. jute waste.

E. J. Keller Co., Inc., Steel Seafarer, Bombay, 100 bls. old jute rags.

C. Comiter, Steel Seafarer, Bombay, 300 bls. cotton waste.

Loumar Textile By Products Co., Billings Victory, Antwerp, 126 bls. jute waste.

S. H. Waldstein, Johannes Maersk, Shanghai, 200 bls. cotton waste.

C. Comiter, Johannes Maersk, Shanghai, 100 bls. cotton waste.

New England Waste Co., Dona Aurora, Shanghai, 100 bls. cotton waste.

Doleco Co., Dona Aurora, Shanghai, 150 bls. cotton waste.

S. H. Waldstein, Dona Aurora, Shanghai, 100 bls. cotton waste.

Atlas Waste Manufacturing Co., Agwidale, Havana, 25 bls. cotton waste.

Midwest Waste Material Co., Cornelius Maersk, Antwerp, 289 bls. jute bagging.

De Vries Trading Corp., Cornelius Maersk, Antwerp, 86 bls. old tarpaulins.

Continental Bank Trust Co., Coer d'Alene Victory, Venice, 47 bls. cotton rags.

(———), Coer d'Alene Victory, Venice, 60 bls. cotton rags.

(———), Fort Spokane, Liverpool, 56 bls. cotton waste.

Chase National Bank, Fort Spokane, Liverpool, 30 bls. wool rags.

(———), Fort Spokane, Liverpool, 80 bls. wool rags.

American Express Co., Fort Spokane, Liverpool, 35 bls. wool rags.

OLD ROPE

(———), Lambrook, Calcutta, 255 bls. old hemp rope cuttings.

GLUESTOCK

(———), Excanaba Victory, Calcutta, 108 bls. gluestock.

CASEIN

F. H. Paul & Stein Bros., Mormacrio, Buenos Aires, 100 bags.

Balfour Guthrie & Co., Mormacrio, Buenos Aires, 499 bags.

NEW YORK IMPORTS

WEEK ENDING MARCH 20, 1948

SUMMARY

Wallpaper	1 pcl.
Filter Paper	15 cs.
Gummed Paper	26 cs.
Photo Paper	3 cs.
Transparent Paper	1 cs.
Kraft Paper	64 rolls
Paper Serviettes	12 cs.
Miscellaneous Paper	76 rolls

BOSTON IMPORTS

WEEK ENDING MARCH 20, 1948

E. Butterworth & Co., Inc., Ames Victory, Antwerp, 225 bls. picker waste.

Green Textile Associates, Johannes Maersk, Shanghai, 100 bls. cotton waste.

S. H. Waldstein, Johannes Maersk, Shanghai, 100 bls. cotton waste.

PHILADELPHIA IMPORTS

WEEK ENDING MARCH 20, 1948

Perkins Glue Co., Mormacrio, Buenos Aires, 500 bls. lactic casein.

A. L. Fairzann, Coer d'Alene Victory, Venice, 226 bls. dark cotton rags.

BALTIMORE IMPORTS

WEEK ENDING MARCH 20, 1948

J. S. Connor, Augustana Victory, London, 1 cs. printing paper.

NEW

—SAP BROWN—ALP—

Paper Color for that low cost brown paper either with or without toning colors

NOW

A reliable supply from American Lignite available in Unlimited Quantities and Lowest Prices

Fast deliveries from Eastern Warehouses

AMERICAN LIGNITE PRODUCTS CO.
IONE, CAL.

Eastern agent—B.M. Snyder III
621 Cherry Street
Phila. 6, Pa.

Say Swiss Will Need Increased Supplies

WASHINGTON—Increased import requirements of pulpwood, paper and paperboard are seen for Switzerland for 1948 by American observers reporting to the Department of Commerce.

The principal pre-war sources of paper and paperboard supplies for Switzerland were Sweden, Finland and Austria. Swiss pulpwood imports have generally run to approximately 10 percent of domestic consumption, or about 20,000 tons. The domestic industry has been unable to meet requirements since post World War I years, and this is still the case, according to the information here. In the period between the two wars, the proportion of domestic pulp used was greatly increased, and during the recent war, Switzerland was compelled to rely almost exclusively on its home supply.

However, in 1946, pulpwood output in the country was only about 120,000 tons, and even with imports, the total available to pulp mills was below requirements. Supplies to the mills in 1948, as in 1947, will depend on imports and the number of workers in the domestic timber industry. Imports of chemical pulp in 1946 ran to 66,000 tons.

The 1947 paper production is estimated by the industry as about 150,000 metric tons, compared with 115,000 in pre-war years. Paperboard production is estimated at 45,000, compared with 30,000 to 35,000 tons prewar. Newsprint is expected to show only about 25 percent of production for 1947.

Swiss demand for paper is estimated at 150,000 tons annually and paperboard, 55,000 tons. Domestic production supplies about 90 percent of paper and paperboard requirements, the remainder being made up of imports.

Interesting facts about PAPER

Photo Courtesy Mr. R. A. Hayward

Papermaking was regarded as a high art in Elizabethan England, where the Queen knighted her papermaker, Sir John Spilman. A shrine to his memory stands in Dartford Church, Kent, and it has been preserved by contributions from the English Fraternity of Papermakers.

INTERESTING FACTS ABOUT HELMERCO BLUE

For producing superior whiteness in bond, writing books and ledgers, HELMERCO BLUE has long been a standard requirement. Added at the beater, it has good working properties and excellent light fastness. It also produces fine light blues in the same group of papers; and in the tinting of paper coatings HELMERCO BLUES produce the much desired high white shade in any formula.

HELMERCO BLUES are available in a range of shades from red to green: M4R Conc., M2RW Conc., MGW Conc., MG Conc., 2GB Conc., M2G Conc., M4G Conc., and M5G.

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DIGESTED

The past year, I am glad to say, has witnessed no falling off either in interest or membership. On the contrary, well over 100 new members have joined the organization since March of last year.

Just a word or two about our financial situation. Back in 1945 our president at that time, Paul Joseph White, requested our treasurer and managing director to make a careful and thorough analysis of our financial set-up and submit recommendations to the board of directors. We may all, in my opinion, regard that piece of work as one of Mr. Haskins' finest contributions during his last few years.

You may remember that in his report he came out boldly for the elimination of most of the limited memberships and the creation of what is now known as a Voluntary Class "A" Membership. His report and recommendations backed by those of our then president, were unanimously accepted and from that day on we have not been plagued with financial problems. And right here I want to say that I am sure the hundred or more of us who accepted the Class "A" type of membership have a lot more respect for ourselves and for the Ass'n.—*from an address by* JOSEPH H. TYROLER, before the Nat'l. Ass'n. of Waste Material Dealers.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1948		Corresponding Weeks—1947	
February 7	99.2	February 8	106.2
February 14	100.5	February 15	104.5
February 21	99.4	February 22	105.9
February 28	102.1	March 1	108.5
March 6 (Revised)	99.9	March 8	104.5
March 13	*100.0*	March 15	107.2

COMPARATIVE MONTHLY SUMMARIES

1947						1948	
Jan.	102.1	May	106.2	Oct.	109.5		
Feb.	105.9	June	106.0	Nov.	109.3	Jan.	100.9
Mar.	106.1	July	93.5	Dec.	101.5	Feb.	*100.5*
Apr.	105.1	Aug.	104.2				
		Sept.	102.0	Year Avg.	104.3		

COMPARATIVE YEARLY SUMMARIES

	1941	1942	1943	1944	1945	1946	1947	1948
Year to Date	88.9	103.7	88.6	88.6	88.2	98.1	104.9	*100.5*
Year Average	97.4	90.4	87.8	88.1	89.4	101.1	104.3	

NOTE: *As of January 10 capacity base increased by 13.3%*

PAPERBOARD OPERATING RATIOS†

Current Weeks—1948		Corresponding Weeks—1947	
February 7	100	February 8	104
February 14	101	February 15	102
February 21	99	February 22	103
February 28	101	March 1	102
March 6	104	March 8	102
March 13	*102*	March 15	104

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1947	99	103	101	100	101	101	90	99	96	101	99	89	98
1948	99	*100*											

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

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EDITORIAL

High Cost of Movement

Strong arguments are being advanced, and quoted, by those who would advance the cause of more extended facilities for moving goods. Influential circles in western Massachusetts are said to have turned from their formerly favorable inclination toward a more highly developed power system based on water power, and to incline toward a development of the Connecticut to make it navigable as far north as Holyoke. In support of their decision they align themselves with the view that cheaper transportation is quite as desirable as is expansion of power sources.

The basis for this view, and the economic conditions which give rise to it, are discussed by a former member of the Massachusetts Public Utilities Commission in a weekly letter issued by the New England Public relations Bureau. The writer, Richard D. Grant, cites a recent study by the Federal Reserve Bank as published in the March issue of the Harvard Business Review. This points to continued enlargement of New England business prospects, but admits that their proportion to figuers for the nation as a whole shows a continuing decline.

"That, it would seem, is the nub of the situation. The New England community is in somewhat the same position as a Chinese coolie who now earns 2,000,000 yen a month instead of the 2,000 he used to get. He may be rich but he's still hungrier than the fellow who counts his wealth in trillions.

"As a matter of fact, Massachusetts has all of the power it can use, with presently planned expansion sufficient to take care of predictable requirements for the next twenty years. Of much deeper significance is the further fact that, by creating a power excess, the underlying reason for New England's economic sickness—if one may call it that—would be aggravated.

"This section of the country is weak, compared with others, because of intense specialization and its situation in a corner of the nation far removed from markets and material sources. Fundamentally, it boils down to transportation and isolation. There are other reasons, of course—climate, for example, which involves the cost of heating and insulating factory buildings and seasonal delays in production. But, according to Prof. William J. Cunningham of Harvard, one of America's outstanding traffic authorities, we ship out of here only salf of the tonnage we take in, because it takes two carloads of unprocessed materials to make a single carload of finished products. The net result is empty freight cars, which do not help shippers to get lower rates, or keep the carriers prosperous.

"More and more, with the passing of years and development of competing centers of manufacture closer to material sources, this difference has been emphasized. Today we have little to sell to the country and the world which does not first have to be brought here for processing. In addition, for every incoming worker hired to run a Massachusetts machine, we must import more food and other necessaries from outside, thereby adding to the already obtuse ratio of inbound shipping facilities. The once-great fishing industry, which used to provide a staple for traffic originating here, has deteriorated to the point where we now import from Canada more than ninety percent of the sea food used for our own consumption.

"Every now and then there is a great agitation about the Port of Boston and its lack of tonnage. There actually is nothing the matter with the port from the standpoint of docks and terminal facilities. People simply will not use them because the traffic is all one way and because there is no longer any advantage of time or distance in routing through Boston for foreign destinations. The ships, the return cargoes and service facilities are all in New York, Philadelphia and Baltimore. Because our many towns and cities are so close together, the average haul per ton mile in New England is but 133 miles compared with 230 for the rest of the country, a high-cost factor which is as elementary as A-B-C.

"A great many other details enter into a narration of New England's great industrial decline, but you can't get around the fact that the more the one-sidedness of our economy is accentuated, the greater becomes the task of holding it together."

Necessary Factor

When Herman G. Rappolt, vice-president of the J. O. Ross Engineering Company, talked before the coating session of the Michigan superintendents last week in Kalamazoo he added considerably to the store of knowledge already possessed by his audience. His long experience in drying problems put the weight of authority back of every detail of his well-planned talk. But he received some unconscious help in getting his message across when with the break caused by a subhead, and a punch line at the end of his remarks additional force was lent to an otherwise general statement. "There's a lot more to drying coated paper than just blowing hot air on it," he remarked. "There must also be a desire on the part of experienced operating men to make the coating operation run smoothly. Without this all-round team work hot air is useless."

W. L. Cook

Editor

SAVINGS AND SMILES AT MANY A MILL

When you discover ways to cut conversion costs you bring smiles to management. At mills operating on an employee incentive basis (and there are many such mills) you also bring smiles to the personnel. Because as conversion costs come down profits go up.

Orr-Chem felts reduce cost of conversion in several direct ways.

1. *They wear longer, and felt costs per ton produced come down.*
2. *There is less down time for wash-ups—just that much more production.*

Less direct but also important benefits are the ease with which Orr-Chems go on and set to the machine, greater freedom from shrinkage or stretch or blowing or matting.

The number of mills converted to Orr-Chem treated felts in a matter of months is indeed impressive, and new converts are made almost daily. These mills—and their workers—are all conversion conscious.

If you have not tried some Orr-Chems you're missing something. Become conversion conscious and forward your specifications.

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THE ORR FELT & BLANKET CO., PIQUA, OHIO

INDUSTRIAL DEVELOPMENT

Developments in Kraft-Process Recovery-Unit Design and Performance

By R. K. Allen[1]

Recent developments in design of Kraft-process recovery units, utilizing the Tomlinson method of combustion, are described. The comparative performance is given of early and recent types of Tomlinson recovery units. Economic factors affecting the selection of recovery-system equipment are included.

The application of steam-generating equipment in pulp mills, utilizing the B&W-Tomlinson method for the combustion of black liquor from the Kraft pulping process, has been described in previous papers by Wilcoxson and Ely in 1937 and 1940.[2,3] Although the B&W-Tomlinson method of combustion has been retained, the many changes made in design since then have affected recovery-unit performance materially. It is the purpose of this paper to describe the principal design changes, the reasons for them, and their effect on recovery-unit performance.

Kraft Pulping Process

A flow sheet for a typical Kraft mill is shown in Fig. 1. The logs entering the mill are first barked, chipped, and then charged into a digester, where they are cooked under pressure with steam, using a solution of sodium hydroxide and sodium sulphide which is the cooking liquor. In the cooking operation the lignin binder holding the cellulose fibers of the wood together is dissolved.

After cooking, the cellulose fibers are separated from the spent cooking liquor in the pulp washers. The pulp then goes through several refining processes and to the paper machine.

As the black liquor comes from the washers, it is quite dilute and has a heating value barely sufficient to evaporate its water content.

The black liquor is concentrated first in multiple-effect evaporators, using steam. It then goes to the recovery unit where it is further concentrated in a direct-contact evaporator, using the sensible heat in the flue gas from the recovery unit.

After the addition of sodium sulphate in the mixing tank to make up for chemical losses in the system, the black liquor is burned in the recovery furnace. In the B&W-Tomlinson method of combustion the concentrated black liquor is sprayed upon the furnace walls for dehydration prior to final combustion of the dried char on the furnace hearth.

In the recovery furnace, heat from the combustion of the organic liquor constituents is obtained and, more important, the spent sodium salts in the liquor are recovered as smelt. Another essential function of the furnace is the reduction of the sodium-sulphate content

[1] Staff Engineer, The Babcock & Wilcox Company. Jun. ASME.

[2] "Burning of Waste Liquors in the Kraft and Soda-Paper Industries," by L. S. Wilcoxson, Trans. ASME, vol. 60, 1938, pp. 25-31.

[3] "Recovery Unit Performance in Burning Kraft Process Black Liquor," by F. G. Ely and L. S. Wilcoxson, *Paper Trade Journal*, vol. 110, May 9, 1940, pp. 30-36.

Contributed by the Fuels Division for presentation at the Spring Meeting, New Orleans, La., March 1-4, of THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS and will be included in the official publication of the transactions of that meeting.

NOTE: Statements and opinions advanced in papers are to be understood as individual expressions of their authors and not those of the Society. Paper No. 48—S-2.

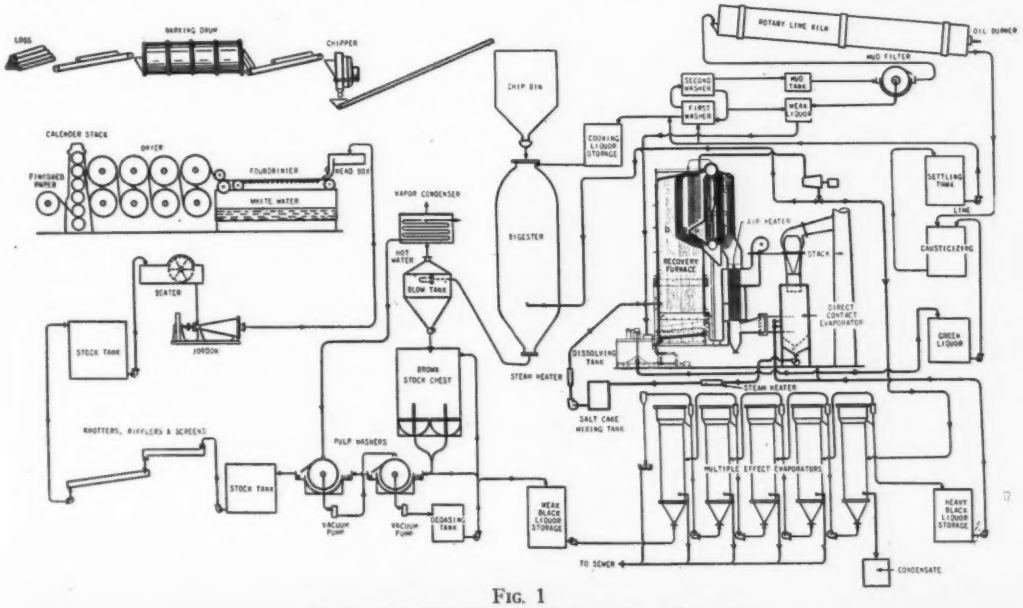


FIG. 1
Diagrammatic Flow Sheet of Typical Kraft Paper Mill

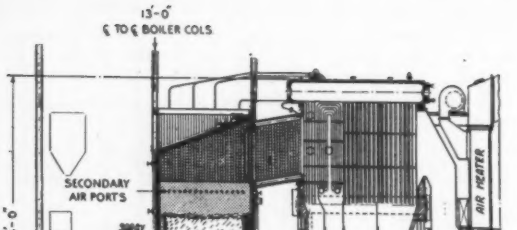


FIG. 2

Three-Drum Recovery Unit Installed in 1937; Capacity 125 Tons per Day

of the black liquor to sodium sulphide.

The smelt, composed largely of sodium carbonate and sodium sulphide, is dissolved in water in the dissolving tank to form green liquor.

The green liquor is subjected to a causticizing treatment to convert the sodium carbonate to hydroxide. The liquor is then ready for use again as cooking liquor in the digester.

Increase in Capacity

One of the most important reasons for the changes made in the design of recovery units during the last 10 years has been the continuing scarcity and high cost of labor, which have made improvement in design necessary in order to reduce operating-personnel requirements. Many of the changes have been made possible by technological improvements, and others have been made as dictated by operating experience with earlier installations.

Perhaps the most apparent change in recovery-unit design has been the increase in capacity of individual recovery units. This has permitted a reduction in the number of operating personnel because of the fewer number of recovery units required for a given mill capacity. Increase in recovery-unit capacity has also reduced the relative over-all installation costs because of the reduced space and building requirements in addition to the reduced cost per ton of capacity of larger size recovery units.

In 1937 the largest B&W-Tomlinson recovery unit installed had a capacity of 130 ton/day.[4] Today, units with capacities up to 275 ton/day are in operation and two 350 ton/day capacity units are under construction. This is nearly 3 times the capacity of the largest unit of 10 years ago.

A typical 125 ton/day unit, installed in 1937, is shown in Fig. 2. This unit has a separate furnace connected to a three-drum waste-heat-type boiler by a water-cooled flue. The concentrated black liquor is sprayed on the side and rear walls of the furnace through an oscillating spray nozzle located in the front wall. The liquor, dehydrated on the walls, falls to the furnace hearth as a char and is burned. To obtain reduction of the sodium sulphate in the char to sodium sulphide and to maintain a low fuel-bed temperature, the char is burned in a reducing atmosphere obtained by supplying a deficiency of air for complete combustion to the fuel bed through primary-air ports located close to the furnace floor. Air to complete combustion is admitted through secondary-air ports higher in the furnace.

Even at the minimum temperature at which stable ignition of the char can be maintained, there is some sublimation of sodium salts from the fuel bed. These vaporized salts are carried from the furnace with the flue gases. As the gases are cooled in passing through the boiler, superheater, and air heater, the sublimed salts deposit out on the heat-absorbing surfaces.

In addition to the sublimed chemical, black-liquor particles with their included sodium salts are entrained mechanically in the furnace gases. These particles adhere to the heating surfaces on contact.

The chemical deposits on the heating surfaces from the sublimed chemicals and the mechanical entrainment of black-liquor particles create a difficult cleaning problem, and in earlier type units such as shown in Fig. 2, considerable hand-lancing was required to keep the boiler, superheater, and air-heater gas passes open.

A 275 ton/day capacity unit of a newer design, similar to that shown in Fig. 3, was placed in operation in 1946. This unit employs a large, completely water-cooled furnace similar to many large central-station power boilers. For protection, the tubes in the smelt zone in the lower portion of the furnace walls and the furnace floor are covered with chrome-ore refractory, anchored to the tubes by pin studs welded to the exposed face and sides of the tubes. The upper portion of the furnace walls and the boiler walls back as far as the rear of the superheater employ a bare-tube, flat-stud construction for maximum heat transfer. The studs are welded to the sides of the tubes to form a continuous, bare-metal wall surface.

Both the boiler and economizer are vertical-tube two-drum types. A tubular gas-air heater, employing parallel flow of gas and air, is included in this particular installation. The gas flows through the inside of the tubes and the air flows over the outside of the tubes, making three passes, crossflow.

The relative physical sizes of the two units, shown in Figs. 2 and 3, can be compared by means of the over-all dimensions shown.

Reduction In Cleaning Requirements

A reduction in the man-power requirements for operation has been made possible by changing the arrangement of the convection heat-absorbing surfaces, particularly the boiler screen and superheater, so that the resulting gas temperature and flow conditions substantially reduce the deposition of chemical solids and facilitate the removal of the solids that are deposited. In the past the cleaning problem has been most severe in the boiler-screen and superheater sections, and the present design provides a more uniform and lower gas temperature across the tubes in these sections.

In general, the chemical deposits on the heating surface in the high-temperature gas zones are hardest, and consequently most difficult to remove. As the gas temperature drops through the unit, the deposits become softer until in the relatively cool zones they appear as a very fine adhesive powder.

A study of actual temperature and velocity conditions obtained by test traverse ahead of the superheater on a 275 ton/day capacity unit similar to the one shown in Fig. 3, is given in Fig. 4. During the time the traverse was made, the unit was being operated at a rating of 273 ton/day with a liquor-firing concentration of 67 percent solids. The values given are the averages of temperatures and velocities taken at seven

[4] Recovery-unit capacity, expressed as "ton/day," is equivalent to burning the black liquor obtained from this tonnage of pulp production per day and assumes that 3000 lb. of black-liquor solids are obtained per ton of pulp produced.

points across the width of the unit at each elevation shown.

The gas velocities and flow paths, determined by Pitot-tube readings, are indicated by vectors on the figure. Temperature measurements, obtained with high-velocity, platinum versus platinum-rhodium thermocouples, are indicated numerically. Other traverses taken at different ratings and liquor-firing concentrations showed temperature and velocity patterns consistent with this example.

The average gas temperature entering the superheater is 1465 F for the traverse shown. The high-velocity thermocouples used on these tests will give temperature values approximately 100 F higher than would be obtained with bare thermocouples. This is due to the cooling of the bare thermocouple below the gas temperature by radiation from the couple to the adjacent relatively cold boiler and superheater surfaces. A high-velocity thermocouple will indicate the true gas temperature, and a bare thermocouple will indicate the approximate temperature of a solid particle entrained in the flue gases. Because the difference in gas temperature indicated by the two methods is large, temperature data from different sources can be directly compared only when taken by, or corrected to, the same method of measurement.

As indicated in Fig. 4, a relatively uniform temperature and velocity distribution is obtained over the height of the superheater, except for a zone just above the superheater floor where reverse gas flow and low gas temperature occur. The boiler-screen and superheater tubes are arranged so that any hard chemical deposits removed from them are returned to the furnace, melted, and discharged through the top hole as smelt. This avoids the difficult problem of handling hard deposits from the boiler hoppers. The relatively low gas temperature and reverse flow above the superheater floor assists the return of deposits to the furnace.

This distinctive and favorable pattern of velocity and

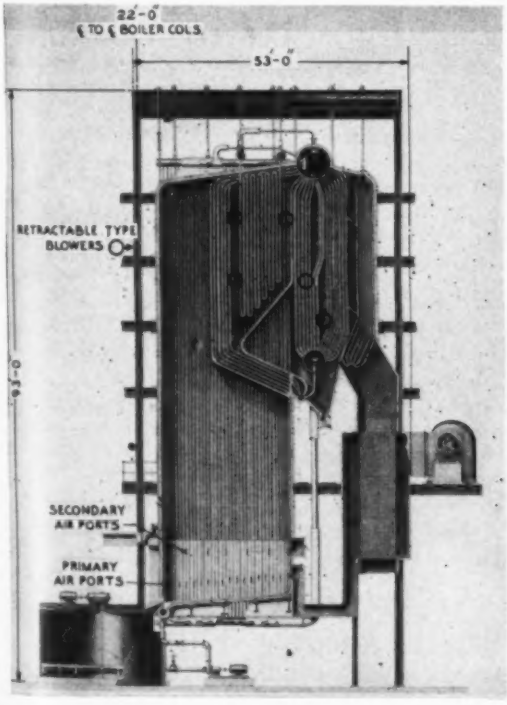


FIG. 3
Two-Drum Recovery Unit; 275-Ton per Day Capacity; Installed 1946

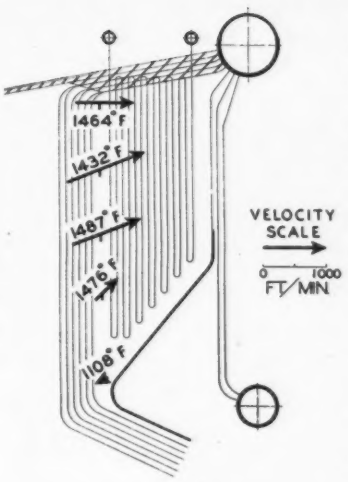


FIG. 4
Gas Velocities and Temperatures Entering Superheater

temperature is due to the furnace gases being directed toward the front of the furnace by the rear furnace arch and also due to the large stack effect produced in the relatively high furnace. This stack effect causes the hottest furnace gases to rise to the top of the furnace before entering the boiler screen. The hottest gases thus exposed to the entire furnace surface are cooled a maximum amount. Because of the forward direction of the the relatively high furnace. This stack effect causes the hottest furnace gases to rise to the top of the furnace before entering the boiler screen. The hottest gases thus exposed to the entire furnace surface as collode a maximum amount. Because of the forward direction of the furnace gases and the stack effect, the static pressure at the bottom of the boiler screen is lower than that at the top. With the low resistance to gas flow through the screen and superheater, the difference in static pressure between the top and bottom of the boiler screen is sufficient to induce a slight reverse flow of relatively cool gases back along the superheater floor and into the furnace. These recirculated gases mix with the high-temperature gases in the upper part of the furnace to reduce the average temperature of the gases entering the boiler screen.

The chemical deposits collecting on the boiler screen and superheater have been found to have a fusion temperature ranging from 1500 F to 1650 F. In order to avoid a difficult cleaning job and the possibility of sulphur attack on the superheater tubes and tube spacers, it is obviously desirable to maintain the gas temperature entering the superheater below the fusion temperature of the deposits. With even temperature distribution to the superheater, it is possible to have the average temperature entering the superheater close to the fusion temperature without the possibility of local smelting which might otherwise occur due to temperature unbalance. The nose baffle under the superheater shields the superheater from radiation from the hot lower portion of the furnace and avoids elevating the temperature of the chemical deposits above that of the surrounding gas.

Burning black-liquor char particles, which may be mechanically entrained in the furnace gases, contain sufficient combustible content to melt the ash included in the char. These burning char particles tend to stick to the tubes of the boiler screen and superheater and produce hard smelt deposits, even though the surrounding gas is at a temperature below the fusion point of the deposits.

Smelt deposits on boiler heating surfaces from this source have been further minimized by reducing the quantity of unburned char particles adhering to the boiler screen and superheater. This reduction has been obtained by lowering the ports for admission of secondary air, necessary for completion of combustion, to just above the fuel bed. This gives maximum time to

burn out the combustible matter in the char particles entrained in the furnace gases. The present lower elevation of the secondary-air ports can be seen from a comparison, Fig. 2 and Fig. 3.

The elevation of the primary-air ports just above the furnace floor has been retained. The quantity of combustion air admitted through the primary-air ports to the fuel bed is kept as low as possible consistent with maintaining stable ignition and the free flow of smelt, the amount generally being about 65 per cent of the theoretical combustion-air requirement. Operating with a minimum primary-air quantity results in less mechanical entrainment of char particles in the furnace gases and helps to reduce the quantity of char particles adhering to the heat-absorbing surfaces.

In the cooler gas zones of the boiler and economizer of the earlier designs, it has been found that the chemical deposits tend to pack and are more difficult to remove at points where the gas velocity and turbulence are highest. In the newer designs it has been possible to ease the cleaning problem in the cooler zones by modification in arrangement of the heating surface and by reducing the flue-gas weight per ton of capacity. The reduction in gas weight has been obtained by reducing the air infiltration to the boiler setting. This has been accomplished by improving the boiler-setting design while retaining an ample number of doors for inspection, access, and lancing. The lance-port arrangement and steel-clad monolithic wall construction used in the boiler walls are shown in Fig. 5.

Operation with a lower excess air at the outlet of the unit has resulted in an increase in thermal efficiency and a reduction in load on subsequent equipment such as the induced-draft fan and precipitator.

Table 1 gives a comparison of the actual performance of the unit shown in Fig. 2, and the newer 275 ton/day capacity unit similar to that shown in Fig. 3. In addition to general operating information, the data include gas temperatures and per cent of theoretical combustion air in the flue gas throughout the units. Liquor analyses, chemical loss, and heat balances are also given. In the higher temperature zones, temperature measurements were made with high-velocity thermocouples as previously described.

From these data the lower gas temperatures and lower per cent air infiltration obtained on the newer 275 ton/day capacity unit are evident. The air infiltration shown between the furnace and economizer outlet is only 5 per cent of the theoretical air required for combustion.

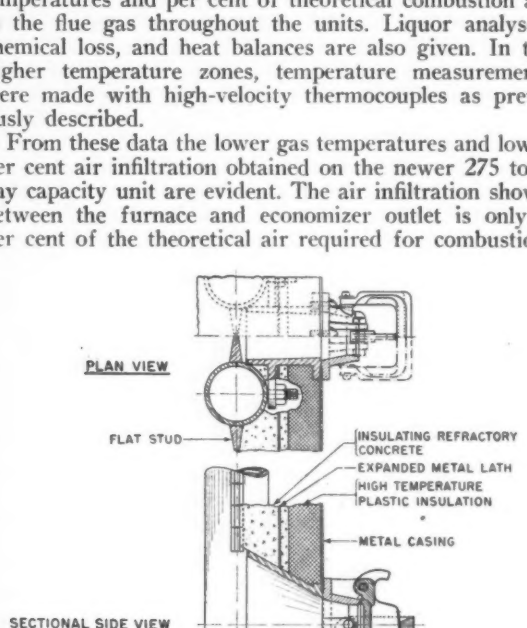


FIG. 5
Lance-Port and Wall Construction

TABLE 1 COMPARISON OF PERFORMANCE OF 125 TON/DAY AND 275 TON/DAY CAPACITY RECOVERY UNITS

Test duration, hr	9.5	8.0
Boiler	Fig. 2	Fig. 3
Rating, tons/day, design	125	275
Rating, tons/day, actual during test	127	273
Steam output during test, lb per hr	50520	114731
Steam pressure, superheater outlet, psi	457	454
Steam temperature, superheater outlet, deg F	690	680
Feedwater temperature, deg F	307	275
Air temperature leaving air heater, deg F	358	343
Heat of reduction of Na_2SO_4, per cent	5.5	2.6
Heat in smelt leaving furnace, per cent	3.8	4.5
Latent heat loss; fuel moisture and H_2, per cent	18.9	16.3
Sensible heat in stack gases, per cent	7.2	7.1
Evaporation in spray tower, per cent	9.2	4.4
Heat absorbed by steam, per cent	54.5	59.4
Unburned combustible loss, per cent	0.8	0.1
Radiation and unaccounted for, per cent	0.1	5.6
Total	100.0	100.0
Black liquor fired, lb per hr	29110	57270
Concentration of black liquor as fired, per cent solids	54.7	59.6
Salt cake fed (as Na_2SO_4), lb per hr	2040	1980
Analysis of black liquor as fired:		
Carbon, per cent	18.65	20.7
Hydrogen, per cent	1.95	2.0
Oxygen + nitrogen, per cent	5.25	4.8
Sulphur, per cent	2.40	2.5
Ash, per cent	26.45	29.6
Moist, per cent	45.30	40.4
Heating value as fired, Btu per lb	3372	3660
Total soda loss in flue gas leaving air heater (as Na_2SO_4), lb per ton	137.5	135
Green liquor reduction, per cent	95.1	93.4
Temperature flue gas leaving furnace, deg F	1860	1710
Temperature flue gas entering superheater, deg F	1550	1470
Temperature flue gas leaving boiler, Fig. 2; economizer, Fig. 3	710	617
Flue-gas temperature leaving air heater, deg F	536	426
Flue-gas temperature leaving direct-contact liquor evaporator, deg F	283	286
Total combustion air leaving furnace, per cent	105	105
Gas analysis leaving boiler or economizer:		
CO_2, per cent by volume	15.1	17.2
O_2, per cent by volume	4.8	1.9
CO, per cent by volume	0.16	0.0
Total combustion air leaving boiler or economizer, per cent	128	110
Total combustion air leaving air heater, per cent	147	118
Total combustion air leaving direct-contact liquor evaporator, per cent	147	118

Soot Blowers

With the easier removal of chemical deposits from the heating surfaces of the newer type unit, and with the numerous cavities provided in the setting, mechanical soot blowers can be applied successfully to clean the entire unit, eliminating the need for regular crews of men to do hand-lancing.

It has been found that the usual types of fixed-position rotating soot-blower elements, which remain in the setting when not in use, do not have a satisfactory life when installed in the high-temperature zone of the recovery unit. As a result of this, and because of the superior cleaning results obtained, retractable-type blowers have been employed. These blowers are withdrawn from the setting except during the blowing cycle when they are cooled by the blowing medium. The type of retractable blower used is shown in Fig. 6. In place of an element with a multiplicity of small nozzles, an element with two large nozzles at the end is used. During blowing, the element moves inward across the setting and then back, rotating continuously during its travel. Either high-pressure steam or air is used as the blowing medium.

To withstand the high impact provided by the steam or air jets from the two large soot-blower nozzles, and to avoid damage to refractory, it has been found desirable to use metallic gas baffles in place of refractory. In the high-temperature zones, the baffles are made up of flat studs welded to, and cooled by, the boiler tubes.

Typical locations for the retractable blowers in the boiler and superheater are indicated by heavy black circles in Fig. 3. Familiar types of fixed-position rotating soot-blower elements, usually of the air-puff type, are installed as necessary in other locations in the boiler and economizer.

The application of retractable-type soot blowers to recovery units is relatively new; however, it follows established practice in the power-boiler field. For a number of years, retractable-type soot blowers have been used

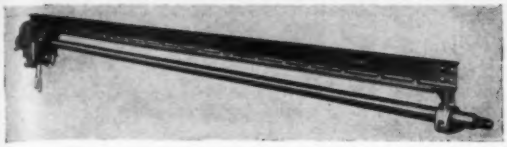


FIG. 6
Retractable-Type Soot Blower

for slag removal in the high-temperature zones of pulverized-coal-fired boilers, and there is a trend toward their use in the lower temperature zones because they eliminate the need for soot-blower bearings in the gas stream, permit maintenance during normal operation, and have a larger effective cleaning radius than the standard types of fixed-position rotating elements.

The older types of soot blowers for gas-air heaters were not very successful and considerable hand cleaning during operation and outages was often required. "Strait-Line" type blowers are now being used and satisfactory cleaning results are obtained without need for manual cleaning during operation or outages.

An outline of a Strait-Line blower is shown in Fig. 7. The blower is equipped with two nozzles per tube-row blown. It moves continuously inward across the air heater and back while blowing. When not in use, it is withdrawn to the side of the heater. Either steam or air is used as the blowing medium.

In addition to improving the soot-blower equipment for cleaning the gas air heaters, it has been possible to eliminate the formation of hard chemical deposits in the tubes by using parallel flow of gas and air in place of counterflow. In counterflow designs, hard dense deposits were caused by condensation of water vapor in the flue gases which combined with the chemical dust. The condensation took place at the gas-outlet end of the air heater where the coldest gas, coming in contact with the tubes adjacent to the incoming cold air, was cooled below the gas dew-point temperature. By using parallel flow of gas and air, the tubes adjacent to the cold-air inlet are heated by the hot incoming gas and consequently are maintained above the dew-point temperature of the gas.

Recovery-System Steam Production

The majority of B&W-Tomlinson units have been equipped with gas air heaters which give gas temperatures to the direct-contact liquor evaporator on the order of 450-500 F, compared to temperatures of 600-700 F on units without gas-air heaters.

Aside from supplying the hot air necessary for stable furnace operation, the use of a gas-air heater permits a higher net steam generation for the entire recovery system. The net steam generation is considered to be the steam generated by the recovery unit less the steam consumed by the multiple-effect evaporators and liquor heaters. Where a steam-coil air heater is used, the Btu in the steam consumed by the heater is also a deductible item; however, the heat input from the steam to the heater increases the Btu output in the steam from the recovery unit roughly by an equivalent amount. A steam air heater, consequently, has no significant effect on the net Btu output in the steam from the recovery system.

The steam production from a given tonnage-capacity recovery unit, including the direct-contact evaporator, depends upon the following:

1 Heating value of the black-liquor solids.

2 Liquor concentration to the direct-contact evaporator.

3 Gas temperature and unburned combustibles in gases leaving direct-contact evaporator.

4 Gas weight leaving the direct-contact evaporator per pound of black-liquor solids. (This is dependent on the liquor analysis and the excess air in the flue gas.)

It will be noted that with items 1, 3, and 4 constant, the net steam production of the recovery system is affected only by the liquor concentration to the direct-contact evaporator, and that it is independent of the liquor concentration as fired. In considering the thermal performance of a recovery unit, the direct-contact evaporator must be considered as an integral part of the unit. In completely dehydrating liquor which is supplied at a given concentration from the multiple-effect evaporators, prior to combustion, a definite amount of heat is required for the evaporation of the water content of the liquor, the amount being independent of the relative portion of the evaporation done in the direct-contact evaporator and in the furnace.

The net steam production of a recovery system versus the liquor concentration from the multiple-effect evaporators is shown in Fig. 8. The liquor concentration leaving the multiple-effect evaporators has been taken as the concentration to the direct-contact evaporator of the recovery unit. Use of water or weak black liquor for dilution purposes in the direct-contact evaporator would be equivalent to reducing the liquor concentration to it.

It will be noted from Fig. 8 that there is an increase in net steam production as the liquor concentration from the multiple-effect evaporators or to the direct-contact evaporator is increased.

Based on a given gas temperature leaving the direct-contact evaporator and a given liquor concentration from the multiple-effect evaporators, the liquor-firing concentration is governed by the gas temperature to the direct-contact evaporator, as shown on the upper portion of Fig. 8.

For design purposes, 55 per cent solids is usually considered the minimum firing concentration at which stable combustion can be self-sustained, and 70 per cent solids is usually considered the maximum firing concentration because of handling difficulties due to extremely high liquor viscosities. With these limits on permissible firing concentrations and with given gas temperatures entering and leaving the direct-contact evaporator, the liquor concentration from the multiple-effect evaporators must be held within certain specific limits. With a gas temperature of 450-500 F, which might be expected from a unit with a gas-air heater, the liquor concentration from the multiple-effect evaporators can vary from approximately 44 to 54 per cent solids without exceeding permissible firing-concentration limits. With a gas temperature of 600-700 F, which might be expected from a recovery unit without a gas-air heater, the liquor concentration from the multiple-effect

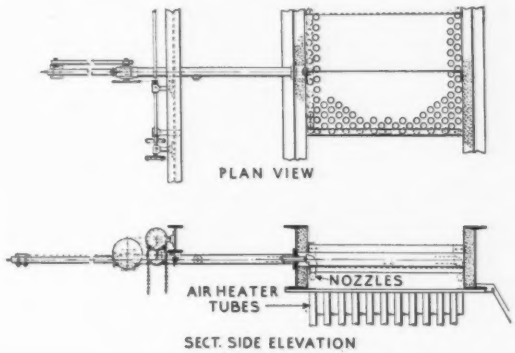


FIG. 7
Strait-Line Soot Blower for Gas-Air Heater

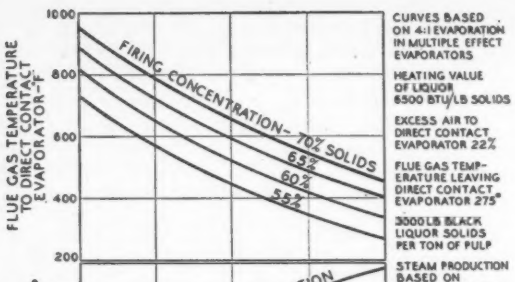

FLUE GAS TEMPERATURE TO DIRECT CONTACT EVAPORATOR-°F
1000
800
600
400
200
FIRING CONCENTRATION- 70% SOLIDS
65%
60%
55%
CURVES BASED ON 4:1 EVAPORATION IN MULTIPLE EFFECT EVAPORATORS
HEATING VALUE OF LIQUOR 6500 BTU/LB SOLIDS
EXCESS AIR TO DIRECT CONTACT EVAPORATOR 22%
FLUE GAS TEMPERATURE LEAVING DIRECT CONTACT EVAPORATOR 275°
3000 LB BLACK LIQUOR SOLIDS PER TON OF PULP
STEAM PRODUCTION BASED ON EVAPORATION FROM AND AT 212°F
NET STEAM PRODUCTION LB/TON OF PULP
9000
8000
7000
NET STEAM PRODUCTION
NET STEAM PRODUCTION = STEAM PRODUCED BY RECOVERY UNIT MINUS STEAM SUPPLIED TO MULTIPLE EFFECT EVAPS. & LIQUOR HEATERS
35
40
45
50
55
LIQUOR CONCENTRATION LEAVING MULTIPLE-EFFECT EVAPORATORS PERCENT SOLIDS

FIG. 8

Recovery-System Steam Production

evaporators can vary from approximately 37 to 45 per cent solids without exceeding permissible firing-concentration limits. From this it can be seen that the use of a gas-air heater permits employing higher liquor concentrations from the multiple-effect evaporators and consequently permits selection of recovery-system equipment to give a higher net steam production than is possible without it.

In order to realize a substantial increase in net steam production through the use of a gas-air heater, it is necessary to provide sufficient multiple-effect evaporator capacity to concentrate the liquor to 50 per cent solids or higher; however, there is no increase in steam production from high liquor concentration to the direct-contact evaporator where the recovery unit is not designed for it.

As an example, assume a gas temperature of 650 F and a liquor concentration of 50 per cent solids to the direct-contact evaporator. Referring to Fig. 8, this would give a net steam production of 9000 lb. per ton of pulp but a liquor-firing concentration of approximately 80 per cent solids, which is above the permissible limit. In order to reduce the firing concentration to 70 per cent solids, the liquor in the direct-contact evaporator could be diluted with weak liquor or water, which would be equivalent to reducing the concentration from the multiple-effect evaporators to 45 per cent solids, and would reduce the net steam production from 9000 lb. per ton of pulp to about 8400 lb. per ton of pulp.

Summary

In the past decade the uses and new applications of pulp and paper products have brought about a tremendous expansion of the industry which has compelled the growth and technical advancement of all component divisions of the manufacturing process. The vital functions of chemical recovery and generation of power and process steam are carried out by the modern recovery unit, which has kept pace with the progress of the industry through the development of new design features and the adaptation of sound engineering developments to provide greater capacity, economy, and reliability in operating service.

NEW LITERATURE

Thew Booklet Describes Lorain Machines in Logging

"Modern Logging With Lorains," an illustrated booklet depicting the widespread use of Lorain equipment in the logging and lumber industries, has just been published by the Thew Shovel Company of Lorain, Ohio.

Containing a wide range of illustrations, the publication describes the efficiency of power cranes and shovels in all operations from timberland to lumber mill. It pictures the employment of Lorain equipment in building logging haul roads, loading logs, skidding and decking, plus the handling of a multiplicity of jobs at the mill. Another feature of the booklet is the illustrated story of how Lorain Moto Crane mobility serves selective logging.

The correct handling of pulpwood as a means of obtaining greater production, lower costs and fewer accidents is pictured in detail as is the efficiency with which Lorains handle finished lumber at the mill or in the dealer's yard.

The booklet also covers the various sizes and lifting capacities of Lorain machines and illustrates the three types of mountings on which the units are built: (1) 2-speed crawler mountings; (2) 2-engine, rubber-tire mountings and (3) single engine rubber-tire mountings.

Amsco Manganese Steel Chain Presented In New Bulletin

CHICAGO—Bulletin 742-CN on Amsco chain has just been released by the American Manganese Steel Division of American Brake Shoe Co., Chicago Heights, Ill., and is ready for mailing upon request.

The contents of this 28-page bulletin include comprehensive information on austenitic manganese steel, "the toughest steel known," and its characteristics. Factual data show the advantages and ultimate economy of manganese steel chain for tough jobs involving shock and abrasion . . . heavy duty applications where the most important qualities are durability and freedom from breakdown. Letters of users are quoted to show five and ten times the "normal" service from Amsco chain in various severe applications.

The bulletin is conveniently arranged, with the principal applications of Amsco manganese steel chain classified. Also included are illustrations of Amsco chain and its applications, Amsco manganese steel sprocket wheels and elevator buckets.

Bulletin 742-CN is said to have a definite message to all who have chain problems and are seeking greater chain service per dollar spent.

New Vibrex Screen Bulletin Issued

PASSAIC, N. J.—A new 4-page booklet, Bulletin No. 122-A, describing the Style M Vibrex Screen has been issued by Robins Conveyors Division, Hewitt-Robins, Inc., Passaic, N. J.

Briefed for quick reading is an explanation of the two-bearing circle-throw principle employed in this screen which has adjustable stroke and easy angle-adjustment. The booklet also tells how the Robins Vibrex Screen, whether floor-mounted or suspended, is always in perfect balance. Applications and the full range of sizes in single or double deck styles are included.

Northern Equipment Bulletins Copes Valve Line

ERIE, Pa. — Bulletin 477, a 12-page booklet describing operation, construction and application of Copes Pressure Reducing Valves has just been released. Address Northern Equipment Co., 1945 Grove Drive, Erie, Pa., for copies.

EQUIPMENT AND SUPPLY NEWS

Lapp Redesigns Pulsafeeder Pumps

ROCHESTER, N. Y.—A new line of Pulsafeeder Proportioning Pumps to be designated as CP models, representing completely new design and providing greater capacities, higher pressure operation and rugged assembly for accurate feeding, has been marketed by Lapp Insulator Co., Inc., Le Roy, N. Y., for laboratory, pilot plant, and industrial processing.

The Lapp Pulsafeeder pump is a combination piston-diaphragm unit, a design that provides important operating advantages. A piston reciprocating over a measured stroke displaces oil, which in turn pulsates a diaphragm. The hydraulically-measured pulsation of the diaphragm actuates the flow of the chemical being handled. Thus the Pulsafeeder pump provides the accuracy of positive piston displacement and measured feed, at the same time incorporating the diaphragm pump advantages of elimination of stuffing box, and complete isolation of chemical from pump parts. All Pulsafeeder pumps are micro-adjustable over the entire capacity range while the pump is in operation.

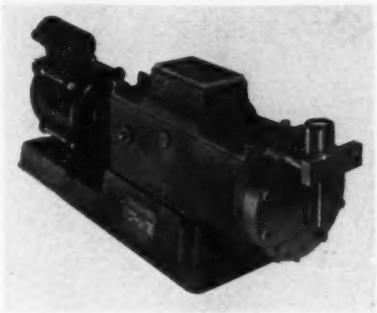
Lapp Bulletin No. 262 describes the CP series of Pulsafeeder proportioning pumps and catalogs specifications. It is available from Lapp Insulator Co., Inc., Process Equipment Division, 746 Maple Street, Le Roy, N. Y.

Magnus Offers Two New Cleaning Materials

GARWOOD, N. J.—The Magnus Chemical Company, Inc., is offering two new liquid cleaning materials to users of steam gun and vapor cleaning equipment. These two new materials (one for light duty cleaning and one for heavy duty cleaning) offer many advantages over paste or powdered materials. The outstanding advantage is that being liquids they canont clog valves of the machine as often times happens with slow dissolving paste or powdered products.

With Magnus Liquid Vapor Cleaner there is no lost time waiting for the cleaner to dissolve. It is instantly and completely soluble in cold water. There is no need for pre-mixing the cleaner in hot water before adding to the machine, thereby saving additional time.

Magnus Liquid Vapor Cleaner can be stored for long periods without deteriorating. Damp, humid weather often causes powdered materials to lump and harden resulting in considerable waste. Because it is liquid, Magnus Liquid Vapor Cleaner can be dispensed and measured out easier from the drum by simply opening the faucet.



Pulsafeeder Pump Model CP

Both 92-K (light duty cleaning) and 94-K (heavy duty cleaning) compounds are clear, colorless, viscous concentrated alkaline cleaners. As they are odorless and fumeless, they may be used indoors without disagreeable affect upon the person doing the cleaning.

Magnus Liquid Vapor Cleaner is compounded to give completely satisfactory results in any make of steam or vapor cleaning machine.

New Metalizing Gun Of Low Air Consumption

LONG ISLAND CITY—The outstanding feature of the new "Light Duty—Low Air" L Gun just marketed by the Metallizing Engineering Co., Inc., Long Island City, New York, is its low consumption of oxygen. Only ten cubic feet of air per minute are used for metallizing.

This new gun also boasts of new turbine construction requiring only one-third the power, making a large compressor unnecessary. The new nozzle construction assures lower cost per pound of metal sprayed because of the low consumption of acetylene and oxygen. And yet another feature is the turbine control which requires only one adjustment for the entire range of metallizing wires.

Considerably lighter than other metallizing guns, the "Light Duty — Low Air" L Gun weighs only 4 lbs. 2 oz., and will spray all kinds of metals by hand or machine on all kinds of work at the lowest installation cost.

Copies of an illustrated and comprehensive bulletin are available on request to Metallizing Engineering Co., Inc., 38-14 30th Street, Long Island City 1, New York. Ask for Bulletin 55.

Micro-Spray Gun Gets Enthusiastic Reception

NEW YORK—An entirely new paint spray gun which makes possible a smoother, higher-gloss finish just marketed by American Brake Shoe Company, Kellogg Division, has been tested by several of the world's leading paint manufacturers in impartial laboratory tests using precision, scientific instruments. They unanimously acclaim its merits.

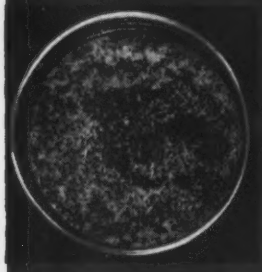
Fourteen engineered extras of the Micro-Spray gun give the user greater versatility and more ease in handling. Simplicity of design saves expensive cleaning and assembly time.

The new, smoother, higher-gloss finish produced by finer atomization and more even paint distribution is made possible by a more uniform flow of air and paint. Detrimental effects from air pressure drop and eddy currents have been eliminated by designing ample air passages in the gun body, and by providing for precision, uniform flow and size of air streams from both wing jets and center orifice. The result is shallower valleys between finer microscopic paint globules and more uniform distribution. A highly accurate control of spray width is provided by the angle of the needle. A large number of revolutions is required to change air flow small degree. A built-in lever gives quick, finger-tip control of desired air volume according to setting marked on gun body.

Another important feature for the user of the Micro-Spray gun is its balance. Because of the shorter overhang and less overhang weight there is less tipping forward, less pull on the wrist from downward torque. The gun feels light in the hand. Fatigue from wrist strain and too tense grip is sharply reduced.

Complete details are available from American Brake Shoe Company, Kellogg Division, 230 Park Ave., New York 17.

You can leave the door...



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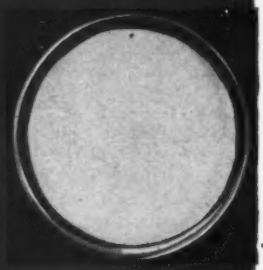

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DOWICIDES

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CHEMICAL COMMENTS

PAINT IMPROVER

Methocel (Dow Methylcellulose) is proving useful in many ways in the paint industry and especially to manufacturers of water-base paints. It keeps pigments from flooding, settling or caking, provides thickening and binding action, and also serves as a pigment disperser. Its protective colloid action prolongs emulsion stability. In addition, its controlled viscosity prevents undue penetration and assures excellent brushing characteristics.

A HOUSEHOLD WORD IN INDUSTRY

Epsom Salt is one of those many-sided chemicals with an important place in a host of diversified industries. It is not only a fine medicinal chemical, but also a rugged standby for many factory jobs. To leather producers, it is a requisite in several stages of the tanning process . . . to textile men, it is important in rayon manufacture and as an aid in dyeing textiles . . . to the paper industry, it is an essential ingredient in sizings. And it takes still other important roles in the ceramic and fertilizer industries.

SOLVING SOLVENT PROBLEMS

Conceded to be one of the best tar solvents known, Dow's o-Dichlorobenzene is coming into prominence as a highly useful cleaning agent for textiles. It is now being used for removing troublesome tar and tar-like substances from wool, and is particularly successful when used in combination with detergent mixtures. In addition to its tar-removing qualities, o-Dichlorobenzene is an effective solvent for waxes, and is an excellent paint remover.

Additional information about any of these products is available on request.

DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

SECTION OF THE

TECHNICAL ASSOCIATION
OF THE PULP AND PAPER INDUSTRY

122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

A Pennsylvania Waste White Treatment Plant*

By Rodney F. Coltart[1]

Abstract

Stream pollution abatement is being accomplished by the Commonwealth of Pennsylvania through its present waste treatment program. The paper discusses a waste white water treatment plant for the Beach and Arthur Paper Company at Modena, Pennsylvania, built and placed in operation in 1945, which has produced excellent results. A close control is kept on the amount of waste white water discharged from the mill. Treatment consists of the addition of alum and soda ash followed by flocculation and sedimentation. The resulting sludge is lagooned. Operating results show a 90% reduction in total suspended solids and 5-day B.O.D. which is well within the State Department of Health requirements.

The Commonwealth of Pennsylvania has been very active in increasing the tempo of its stream pollution abatement program. Legislation has given the State Sanitary Water Board very broad powers for the enforcement of the present antipollution laws. The amount of construction for waste treatment plans is rapidly increasing today.

Stream pollution abatement however is not something relatively new in Pennsylvania, however, since many municipalities and industries have built plants for the treatment of their sewage or industrial wastes. Some municipalities and industries have escaped being required to build treatment plants, only because of the existing condition of the receiving stream, the lack of "know how" as to the most economical method of treatment or by the fact that the abatement program was seriously interrupted by World War II.

It can probably be stated that Pennsylvania through its classification of streams and treatment program is correcting the first condition, research by chemists and sanitary engineers is developing data to eliminate the second condition, and the third condition is passing out of the picture by the increasing availability of materials, and the stabilization of construction costs.

The design and operation of the waste treatment plant at the Beach and Arthur Paper Company at Modena, Pennsylvania is described. This paper mill is located on the Brandywine Creek, the source of several public water supplies, and it was essential that a high degree

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* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 23-26, 1948.

[1] Sanitary Engineer, Link-Belt Co., Indianapolis, Ind.

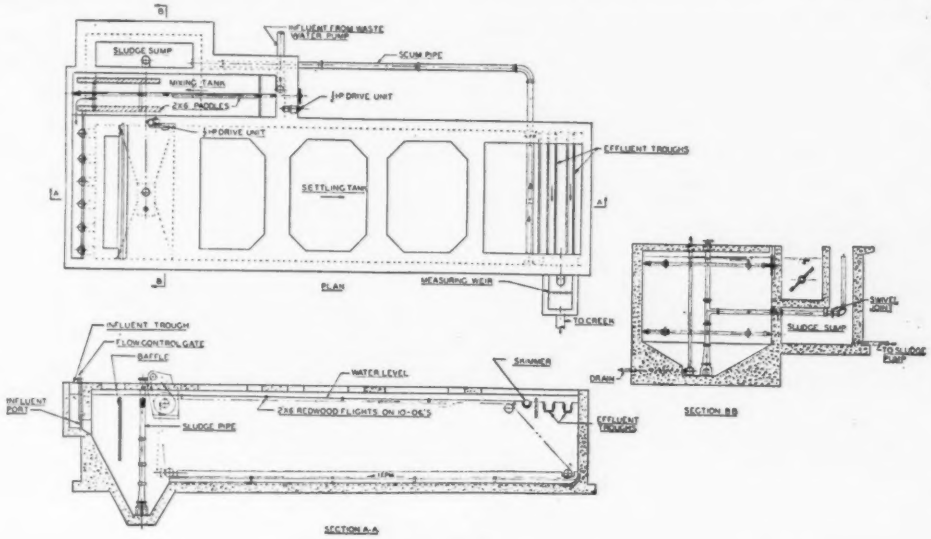

FIG. 1
Settling and Mixing Tanks

TABLE I.—SLUDGE ANALYSIS

	Dry Solids in as Received Sample, %	Water in as Received Sample, %	Long Fiber on Oven Dry Solids, %	Ash on Oven Dry Solids, %	Fiber Analysis
Sampled from dry pile—					
1 foot from top....	21.0	79.0	21.4	18.7	Long and short fibers from chemically prepared pulps, short fibers of groundwood, plus non-fibrous materials such as clays, alum floc, etc.
2 feet from top....	20.0	80.0	24.0	20.8	
3 feet from top....	21.0	79.0	16.1	20.8	
4 feet from top....	22.3	77.7	12.5	24.2	
5 feet from top....	23.2	76.8	34.0	15.8	
Sampled from wet pile—					
3 feet from bottom	18.0	82.0	16.7	23.6	

of treatment be provided for the waste water from the plant.

This paper mill began operations in 1937, but the recent war prevented the construction and placing in operation a waste treatment plant until January 1945. The mill at present has an average capacity of 30 tons of product per day and operates on a 6-day week. Sixty five per cent of the total production is on six colors and white manifold and writing paper. The remaining production is on die wipe and napkin papers. Bleached sulphite is the principal pulp used in the manufacture of these papers.

Investigation

The first step in the treatment program was to reduce to a minimum the amount of waste discharged to the stream. A white water recirculation and control system was installed, so that the foreman would know when surplus white water was being discharged from the system. All surplus white water passes through a 70-mesh cylinder mold type of saveall, before discharge to the waste treatment plant. The solids reclaimed from this saveall contain about 92% moisture and are returned to the stock chest for reuse.

The sources of various waste waters were combined in a common sewer, so that all waste water would be treated before entering the receiving stream. Flow tests showed that 14,000 to 18,000 gallons of waste water were discharged per ton of paper manufactured, and on a 25-ton per day basis, this amounted to 450,000 gallons per day.

Laboratory experiments showed that with proper chemical treatment, a mixing period of 15 minutes and a settling period of 4 hours a satisfactory effluent could be produced. A treatment plant was designed and built on this basis, but increased production to 30 tons per day has increased the flow to 540,000 gallons per day, and reduced the mixing and settling periods to 12.5 minutes and 3.2 hours respectively.

The treatment plant as built consists of a small pump station where the waste water is screened through a ½ inch bar screen, and is elevated about 12 feet for passage through the treatment plant proper. Dry feed machines are used for feeding alum and soda ash ahead of the centrifugal pump. By adding the chemicals at this point, a flash mix is obtained for thorough dispersion of the chemicals in the waste.

The treatment plant consists of a mixing tank, 5 feet wide by 5 feet water depth by 25 feet long, having a capacity of 4,680 gallons and a settling tank 16 feet 0 inches wide by 10 feet average water depth by 60 feet long having a capacity of 72,000 gallons. The mixing tank is equipped with a horizontal shaft type slow mixer which flocculates the waste and chemicals as they pass through the tank. After flocculation, the wastes enter the settling tank which is equipped with a straightline type of sludge collector and skimmer.

The sludge collector conveys settled solids along the floor of the settling tank to a hopper at the influent end, where the sludge is withdrawn through a swivel pipe by hydrostatic pressure.

The collector on its upper travel conveys any floating solids to the effluent end of the tank, where they are drawn off through a rotable skimming pipe and discharged into the sludge sump. A float controlled centrifugal pump discharges the sludge to a lagoon. The effluent from the settling tanks passes over multiple weirs before discharge to the Brandywine Creek.

Operation

The operation of the plant is practically automatic. The bar screen is cleaned manually several times per day, and the chemical feeders filled once per day. About 24 p.p.m. of alum and 12 pounds per minute of soda ash are required for adequate treatment. Best results are obtained when a percentage of 6.2 to 6.3 is maintained in the plant effluent. The slow mixers and sludge collection are operated continuously and sludge is withdrawn for a period of about 1 hour each morning.

When the plant was just placed in operation, the sludge from the settling tank was dewatered on a blanket type saveall which reduced the water content from 96 to 82%. The long fiber content is about 21% and the ash content about 22%. A nearby board mill experimented with trying to reclaim this material, but it was found that the percentage of long fibers was too low and the ash content too high.

With the plant operating at about 115% of its design capacity, the results obtained have met the highest expectations of all concerned. A survey was made by the State Department of Health, and the results show that 92% of the total suspended solids and 90% of the 5-day B.O.D. are removed from the waste white water at the treatment plant. It would not be unreasonable to expect that other plants with wastes of a similar characer could reduce their waste to a B.O.D. population equivalent of 30 per ton of product and their volatile suspended solids content to 10 pounds per ton of product. The operating results of the above plant are well within these figures.

In designing new waste treatment facilities, the following points should be considered as essential.

1. Water usage and water wastage in the paper mill should be reduced to a minimum.

2. The waste should be pumped to the treatment plant at as near a constant rate as possible.

3. Chemicals should be flash mixed with the waste followed by 30 minutes slow mixing and four hours settling.

4. The use of reclaimed stock to date has not proven practical.

5. The above design provides a plant that is simple to operate and will produce an excellent effluent.

Acknowledgment

Treatment of Waste White Water at Beach and Arthur Paper Company by A. W. Redlin and J. J. Gilbert. Published in the *Paper Industry and Paper World*, April 1946.

TABLE II.—OPERATING RESULTS OF TREATMENT PLANT

	Above Stream	Wastes Untreated	Wastes Treated	Removal Per cent
Turbidity, p.p.m.	25	700	40	94
Total dissolved solids, p.p.m.	140	220	280	..
Volume disssolved solids, p.p.m.	80	100	120	..
Fixed dissolved solids, p.p.m.	60	120	160	..
Total supended solids, p.p.m.	30	520	40	92
Volume suspended solids, p.p.m.	30	460	40	91
Fixed suspended solids, p.p.m.	0	60	0	..
Oxygen consumed, p.p.m.	3.8	52	9.6	..
Total alkalinity, p.p.m.	31	26	32	..
B.O.D. (5 day) p.p.m.	2.2	145	14	90
pH	6.9	6.4	6.3	..
2 hour settleable solids, ml./l.	0.05	65	2.0	..
8 hour settleable solids, ml./l.	0.05	55	2.0	..
OTHER DATA				
Tons of product per day			28.5	
Gallons of waste water per day			520,000	
Gallons of waste water per ton of product			18,400	
Total sewage B.O.D. population equivalent			364	
Sewage B.O.D. population equivalent per ton of product			13	
Volatile S.S. in pounds per ton of product			6.1	

(During this survey a clean-up occurred on one of the two machines at this mill.)

Heating Water with Waste Heat*

By L. G. Janett[1]

Abstract

Heating of white water and fresh water has been carried out in a group of installations of spray washer and scrubber installations to give some operating data and experience confirming the heat recovery possibilities.

Northern mills obtaining water supply from fresh water streams can effect economies in steam as well as improved operating efficiencies. Uses for the heated water are of primary importance in justifying installation of such equipment.

There are several proven methods of recovering heat from paper machine exhaust vapors, probably the most efficient of which is that of direct heating of water. Before going into the mechanisms of water heating itself it would be well to examine the potential uses of the heated water obtainable.

Hot Water Uses

A point where steam is used for direct heating of water or paper stock is a possible application for heated water. The following applications of hot water from heat recovery systems are currently in operation in a number of mills:

1. Oliver filter showers, in lieu of steam heated water.
2. Fresh water head box showers.
3. Fresh and white water wire showers.
4. Fourdrinier, to prevent winter freeze-up of suction presses due to high vacuum and low water temperature.
5. Cylinder molds, to raise mold effluent temperatures from 40 to 64°F. in one case.
6. Filter plant mixing basin to raise winter water temperature, improving the floc obtained with greatly reduced alum dosage.

There are additional potential uses that can be examined, including the following: 1. heating log ponds in cold climates; 2. on barking drums to reduce steam usage; 3. pulp washing, and 4. in beaters using wet lap pulp.

Cylinder Machine Water Heating

To discuss some of the aspects of the use of hot water it has been stated by Hedbring *(1)* that on cylinder board machines it is advantageous to maintain elevated vat water temperatures from a defibering and production standpoint. This indicates need of white water heating prior to its introduction to beaters. Indirect heating of white water by means of a tubular heater may be used satisfactorily, but if there is no surplus process steam available, white water heated in a machine exhaust heat recovery system can result in appreciable heat savings. Direct heating of the white water with steam is certainly less desirable than either indirect steam heating or heated white water from a recovery system because of the loss of the steam condensate not returned to the boiler, which increases boiler water makeup treatment requirements.

It is further indicated *(1)* that some mills require a separate heated fresh water system for charging top liner vats when changing colors. Fresh water, white water, or clarified water all can be heated to advantage for felt, cylinder, deckle, and suction roll showers as well as for some consistency regulators.

Water Contamination

The question of whether or not heated fresh water from a spray recovery system in hood exhaust can be used for showers and wet end purposes due to entrained fiber and dirt is pertinent. An analysis made on water sprayed in an economizer system on a machine where a relatively high amount of fiber was contained in hood exhaust gave the following values:

FRESH WATER SOLIDS ANALYSIS
Total solids = 0.57 lb. per 1000 gal.

Fibrous		
Very short fibers	= 20%	
Medium fibers	= 50%	
Long fibers	= 20%	
	90%	= 0.513 lb. per 1000 gal.
Non-fibrous		
Discrete particles	= 2%	
Dirt	= 8%	
	10%	= 0.057 lb. per 1000 gal.

It is possible to remove much of the entrained fiber from heated fresh water by an inclined screen. The dirt particles present can be best removed, if the use of the water so requires it, by means of a water filter rather than filtering the hood exhaust air to the water heating system.

There are unquestionably almost as many individual uses for hot water as there are paper machines because of the various operating methods in use. The possible uses of the water will in most cases be the determining factor justifying hot water recovery systems because the feasibility of the systems is well established.

Theoretical Recovery Possibilities

Heat exchange between water and vapor-laden air is high because of the relatively high coefficient of transfer through liquid films as compared with dry metal air surface coefficients.

To examine the theoretical recovery possibilities of a given case take as a basis 1 pound of dry air with associated water vapor having a quality of 130°F. Dry bulb, 110°F. Wet bulb, 48% saturation, with total heat content of 91.9 B.t.u. Then use a datum of 40°F. for entering water temperature and 40°F. saturated air leav-

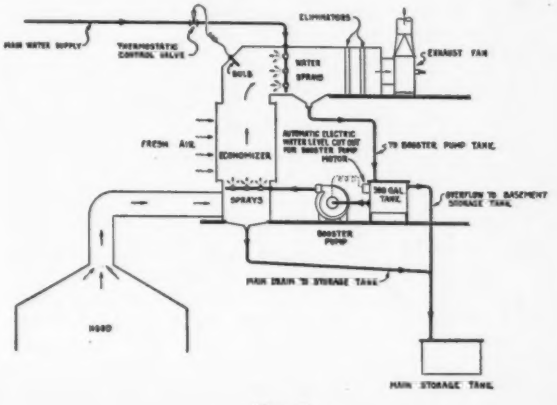

FIG. 1

* Presented at the Second Engineering Conference sponsored by the Technical Association of the Pulp and Paper Industry held at The Bellevue-Stratford, Philadelphia, Pa., Nov. 3-5, 1947.

[1] Sales Engineer, J. O. Ross Engineering Corp., Chicago, Ill.

ing the stack. If the pound of air were cooled from 130°F. Dry bulb, 110°F. Wet bulb to 40°F. saturated, the heat lost would be 76.9 B.t.u. This quantity of heat transferred to 1 pound of water would theoretically raise its temperature 76.9°F.

In an actual paper machine installation it is not practical to heat 1 pound of water with 1 pound of air plus water vapor. Considerably more air than water must be used. It is further obviously impractical to make a spray system of such length and size to bring the leaving air-water vapor mixture down to entering water temperature. A practical actual installation must be a compromise to give the best installation possible.

Practical Installation Design Factors

Any particular paper machine installation must be designed around the quantity of water to be heated, the entering water temperature, and the quantity and quality of the hood exhaust air. Some general observations of the conditions encountered can be made.

First, the question of a Briner economizer must be considered. In a cold climate where a Briner economizer is required, a water heating system must be so designed to allow for a portion of recoverable heat to be reserved for air heating. The fresh air heating possibilities need not be materially reduced by the addition of water heating equipment, although the quantity of water that can be heated will be somewhat less.

Second, the initial temperature of the water to be heated and hood exhaust temperatures must be considered. With low water temperatures just above freezing the thermal head between water and air is large, and accordingly the recoverable heat is relatively large. This factor will be illustrated in the following figures.

Third, the type of water to be heated must be considered. White water in general indicates the need for a scrubber type of air washer without nozzles to overcome clogging difficulties. Fresh water requires the use of spray type washers or cooling type finned coils for heating water if a closed system is required. The coil type system of indirect heating of water has a greatly reduced heat transfer coefficient and can be justified in some special cases to heat boiler feed, for example, where abnormally high hood exhaust wet and dry bulb temperatures obtain.

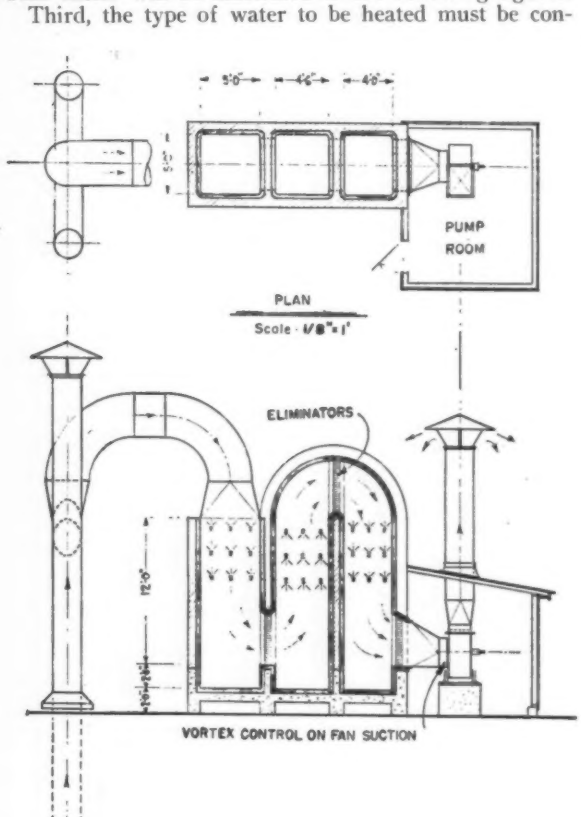

FIG. 2
Three Stage Water Heating System

One general method of heating fresh water is shown in Fig. 1 which is applied in conjunction with a Briner economizer in northern and Canadian mills. Basically the cold fresh water is sprayed into the exhaust air leaving the economizer in such a manner that the water does not run down through the economizer plates but is drawn off ahead of eliminators preceding the exhoust fan suction. This heated water enters a small recirculation tank from which a lesser quantity is sprayed into the higher temperature exhaust air ahead of the economizer to absorb additional heat. The effluent from this secondary spray chamber is drained to the main storage chest along with the primary spray chamber water overflowing from the recirculation tank. A thermostat control actuated by a bulb in the leaving exhaust air passage from the economizer automatically shuts off the fresh water sprays when the exhaust air temperature drops due to extended paper machine production interruptions caused by breaks or other reasons. This automatically prevents cold fresh water from entering the hot water storage tank. In this particular spray application the economizer plates are kept uniformly wetted by the secondary sprays, materially improving the recovery of heat in the fresh air passed through it.

A typical method of heating water with a spraying system only is shown in Fig. 2. This particular arrangement is a proposed installation for some equipment outside the paper industry where a relatively small quantity of air having a very high total heat content is available at a temperature of approximately 158°F. and practically saturated. The initial water spray temperatures are somewhat higher than average, being 65°F. in the winter time and 80°F. in the summer. With this arrangement it is calculated that 325 gallons per minute can be heated from 65 to 125°F. during the winter months or 400 gallons per minute from 80°F. to 125°F. in the summer time. This recovery would amount to a heat saving of 9,750,000 B.t.u. per hour in the winter time and 9,000,000 B.t.u. per hour in the summer time.

This particular installation is arranged for vertical air flow through the three passes through three stages of multiple spray banks, each supplied by a circulating pump requiring a 15 h.p. motor. This particular enclosure is designed to be built of salt glazed tile to reduce maintenance and corrosion.

This spray type of washer can very well be adapted to paper machine exhaust where no economizer is used to obtain high recovery rates with a minimum investment. For a paper machine installation the air flow could be designed to be horizontal, similar to that of standard air washer construction.

Where white water is to be heated without any economizer system it is entirely feasible to use one, two or three stages of scrubbers with the water flowing from one to the other in a counter current manner to arrive at subsequently the same water temperature rises without the use of nozzles.

There are several companies which regularly build cooling towers with some standard type of filling that

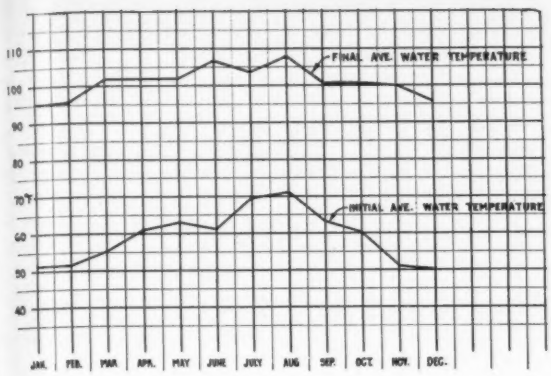

FIG. 3

can also be adapted to heat recovery of this type. Several different types of cascade towers are adaptable for heat recovery.

Mill Operating Data

Data are plotted in Fig. 3, giving monthly average water temperatures entering and leaving a spray system installed on the discharge side of a standard Briner economizer. This particular installation utilizes approximately 167 gallons per minute and the heated water is used to raise the temperature of the mill supply water going into a filter plant mixing basin to obtain considerable reduction in alum dosage required, together with a better floc. It should be noted that as the entering water temperature rises the final water temperature also rises at a lesser rate, which, of course, indicates the expected reduction in heat recovery when the thermal head between the paper machine exhaust air and the entering water temperature is decreased. The water temperatures entering and leaving the system for the month of June should be noted because of the fact that because there was a decrease in the water temperature as compared with the month of May, and a corresponding increase in the leaving water temperature, it is presumed that the outside air temperatures or hood exhaust temperatures during the month of June were considerably higher than normally would be expected.

In Fig. 4, covering data from the same equipment as that from which Fig. 3 was plotted, the upper curve has been added to show the recovery from equipment on a second machine adjacent to machine "A" in the same mill, on which a spray system only is applied with no Briner economizer. This spray system on machine "B" handles a very large volume of water and is essentially operated to raise the mill supply water temperature and to stabilize it at as nearly a uniform temperature the year around as possible. Accordingly, the amount of water sprayed is reduced very markedly during the summer months to the point where it is not operated at all from July to September. It will be noted that, inasmuch as the water from the machine B system is used for spraying in machine A equipment, with the relatively small recovery of approximately 230,000,000 gallon degrees for the month of June from Machine B, the relatively low mill water supply themperature for this month resulted in a high recovery on machine A, for the month of June.

The middle curve somewhat accentuates the seasonal savings from month to month because of the fact that coal costs are generally lower during the summer months than they are during the winter months at this particular mill.

Typical Data

The following table gives some typical operating data from five machines, the first two of which are those covered on data presented in Figs. 3 and 4.

TABLE I.—TYPICAL AVERAGE WATER HEATING OPERATING DATA

Machine	Type of System	Production, tons/day	Water, g.p.m.	Initial Water Temp., ° F.	Final Water, ° F.	Temp. Rise, ° F.
A	Sprays with economizer	110	167	59.4	101.3	41.9
B	Sprays only	90	500-600	(0 to 1490 million-gal.-degrees)		
C	Sprays with economizer	...	300	37	81	44
D	Scrubber with economizer	65	250	60	93	33
E	Sprays with economizer	70	...	42	81	39

Machine C, with the temperature rises shown, would be operating with a rate of heat recovery of 6,600,000 B.t.u. per hour. This particular unit is a newsprint machine in Canada. Machine D covers apparatus used for heating white water only.

General Design Considerations

When operating the scrubber type of equipment it is quite essential that proper consideration be given to the

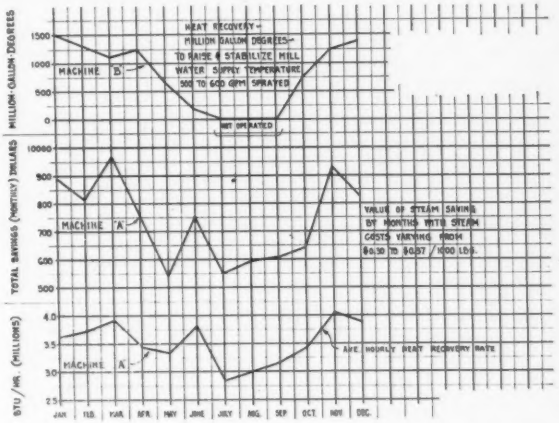
HEAT RECOVERY - MILLION GALLON DEGREES - TO RAISE & STABILIZE MILL WATER SUPPLY TEMPERATURE 500 TO 600 GPM SPRAYED
MACHINE "B"
NOT OPERATED
MACHINE "A"
VALUE OF STEAM SAVING BY MONTHS WITH STEAM COSTS VARYING FROM $0.30 TO $0.87 / 1000 LBS.
MACHINE "A"
AVE. HOURLY HEAT RECOVERY RATE
MILLION GALLON DEGREES
TOTAL SAVINGS (MONTHLY) DOLLARS
BTU / HR. (MILLIONS)
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV. DEC.

FIG. 4

design of the weirs and sumps to prevent undue clogging of the drains with white water fiber, and to prevent turbulence that will cause excessive foaming as much as possible. The eliminator plates on scrubbers must also be provided with ample access for cleaning.

When heating white water it is quite essential that proper consideration be given the materials of construction of equipment. The centrifugal wheels in a scrubber should be built of stainless steel and the scrubber housings can very advantageously be built of a corrosion resistant metal such as stainless iron, which is a high chromium, low carbon iron, with no nickel. This metal has an effective resistance against most alkaline conditions. It should also be borne in mind that if any slime conditions obtain in the white water system this problem will also be involved in a scrubber, although the condition should not be serious unless the white water system is completely closed.

General Summary

The first consideration that must be examined when contemplating heating of water is that of the points of usage and the quantity of heated water than can be used in a particular mill. In general, it would seem desirable to establish a use for not less than 50 to 75 gallons per minute for any small tonnage machine be-

fore considering water heating. This statement would apply to either white water heating or fresh water heating. Second, the temperature of the entering fresh water to a heating system must be considered. If the fresh water temperature exceeds 60 to 65°F. it may prove to be a border line application for heating fresh water, unless the hood exhaust wet bulb temperatures are particularly high. Normal white water entering temperatures will be higher in general and multistage type scrubbers can be considered. Third, the quantity and quality of the hood exhaust air must be examined for a particular machine. If the hood exhaust volume is excessive and the machine is operated with very low steam pressures, such steps must be taken to carry as high wet bulb conditions as are feasible with respect to room operating conditions and in some cases the exhaust quality may not be high enough to effect a worthwhile heat saving, although such cases would be rare. In general, any paper machine exhaust air will provide sufficient heat for effective water heating. Fourth, outdoor weather conditions have a bearing on the amount of recoverable heat. For example, in a moderate climate where outdoor temperatures are relatively low and humidity is low, the quality of hood exhaust will be correspondingly lower, affording less recoverable heat particularly if excess exhaust volumes exist from the machine hoods.

To consider the saving possibilities through hot water heating as compared with recovery through a Briner Economizer System, it can be stated that in general a greater percentage of heat recovery, as well as greater absolute values of B.t.u. recovery, can be obtained from a hot water system than from a Briner Economizer alone.

Literature Cited

1. Hedbring, O. E. S., *Paper Trade J.* 124, No. 20 (May, 1947).

Process Water Used in the Manufacture of Papers Containing Groundwood*

By J. G. Patrick[1]

Abstract

A summary is given of the replies from thirty-six units manufacturing groundwood papers relative to the quality of them with waters.

As a project on the program of the TAPPI Water Committee[2] to investigate the waters required for the Manufacture of the various kinds of paper this is a summarized study of—"Process Water Used in the Manufacture of Paper Containing Groundwood."

A questionnaire prepared by the committee was distributed to nearly 100 mills manufacturing this type of paper. Thirty-six mills responded. The names of the mills are kept confidential through the use of identifying code numbers, hence, no geographical location can be given. It is apparent from some information that mills in both the United States and Canada are represented.

Raw water supplies are taken from rivers, lakes, and wells. Thirty-five respondents use surface water that is reported to be contaminated by sewage and/or industrial wastes.

The raw water for twenty-nine mills is simply treated with mechanical devices, namely screen wire ranging from 44 to 100-mesh, and a few have pressure or gravity filters. For their process water twenty-one mills use chemical treatment, fourteen of which only chlorinate, and the other seven provide full treatment with alum to aid coagulation sedimentation and filtration.

Groundwood being the most susceptible of all the pulps to attacks by microorganisms it is necessary to treat with sterilizing agents and slime inhibitors for control. As a toxicant, chlorination is employed by nine mills, chlorines by five mills, while twelve mills report no treatment.

The general composition of the several kinds of water is shown by the tabulation below of the usual various constituents, noting the maximum and minimum values for the raw waters, and the process waters with its permissible upper limits. These data prominently show, with only a few mills reporting, any permissible limits whatsoever that close control of quality of the water is relatively not so important for the manufacture of papers containing groundwood, as with some other kinds of paper.

In Table I the data indicate the waters used vary considerably over a wide range for most constituents. The data given for some are confusing as it is doubtful whether such values exist or are wrongly reported. It is quite apparent these waters can have greater tolerances in general quality than that required by the manufacturers of higher grades of paper, such as bond and ledger. Little effort seems to be made beyond removing the suspended solids to treat the raw water for process use. After this the destruction or the control of the microorganisms in the manufacturing process is the outstanding problem. To even suggest a tentative standard of water quality for this groundwood paper, according to the data submitted by the respondents to the questionnaire, would be a difficult task, for there is no evidence of any agreement by these mills as to the constitution of a satisfactory process water.

Water Constituents to Be Controlled

Other information about the waters provided by the questionnaire is briefly given in the following statements.

Regarding the water constituents most important to control the mills listed them in order as:—Bacteria and organic matter (slime), color, pH, hardness, turbidity, insolubles, and chlorides. The reasons for controlling these constituents are listed as follows:—

a. Bacteria and Organic Matter
   - Cause slime
   - Lowers sanitary quality of paper
   - Decreases cleanliness
   - Reduces color

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* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 23-26, 1948.

[1] Member TAPPI Water Committee; Chief Chemist, West Virginia Pulp and Paper Co., Luke, Maryland.

[2] TAPPI Water Committee: L. B. Miller, Chairman, Dept. of Chemical Engineering, Univ. of Cincinnati, Cincinnati, Ohio; C. M. Connor, Glassine Company, Conshohocken, Pa.; A. S. Erspamer, P. H. Glatfelter Co., Spring Grove, Pa.; R. B. Martin, Wallace & Tiernan Co., Newark, N. J.; Miss L. E. McGrath, Booth Chemical Co., Elizabeth, N. J.; E. N. Poor, American Cyanamid Co., Stamford, Conn.; C. C. Porter, Southland Paper Mills, Lufkin, Texas; R. B. Weston, Atlantic Refining Co., Philadelphia, Pa.

TABLE I

	Raw Waters Lowest and Highest Concentrations Reported	Process Waters Lowest and Highest Concentrations Reported	Permissible Upper Limits for Process Waters, p.p.m. Specified by Different Mills
Turbidity, as p.p.m. SiO_2	0 to 50	0 to 10	0.5
Color in color units	0 to 300	0 to 65	10, 20, 50
Total solids in p.p.m. (at 105° C.)	9.03 to 315	38 to 315	None Specified
(Suspended solids filtered out before determinations below)			
Aluminum, as p.p.m. Al	0.1 to 1.75 *X*	0.1 to 0.3	None Specified
Iron, as p.p.m. Fe	0.02 to 1.0 *X*	0.02 to 6.1	None Specified
Manganese, as p.p.m. Mn	00 to 0.1	*O*	None Specified
Calcium, as p.p.m. Ca	1.07 to 59	5.0 to 94	None Specified
Magnesium, as p.p.m. Mg	0.83 to 20	1.2 to 18	None Specified
Noncarbonate hardness, as p.p.m. $CaCO_3$	0 to 194	0 to 124	None Specified
Carbonate hardness, as p.p.m. $CaCO_3$	7.0 to 69	0.5 to 130	None Specified
Methyl orange alkalinity, as p.p.m. $CaCO_3$	0 to 181	0.7 to 181	None Specified
Phenolphthalein alkalinity, as p.p.m. $CaCO_3$	0 to 8	None Reported	None Specified
pH	5.8 to 8.5	5.0 to 7.5	None Specified
Sulphates, as p.p.m. SO_4	3.2 to 60	Trace to 60	None Specified
Chlorides, as p.p.m. Cl	0.5 to 40	0 to 13	None Specified
Silica (soluble), as p.p.m. SiO_2	0.44 to 23	0.6 to 12	5.0
Organic matter in p.p.m.	0 to 136	1.5 to 20	None Specified
Dissolved solids in p.p.m.	4.9 to 280	30 to 225	None Specified

X Some intermediate figures include both aluminum and iron.

..*O* Only one mill reporting gives same values for raw and process waters.

Affects appearance
Makes unsaleable product
Causes abnormal number wash-ups
Decreases production

b. Color
Lowers brightness
Affects bleaching
Reduces quality of paper

c. pH and Alkalinity
Required to combat corrosion
Affects product
Interferes with sizing
Needed as control for flocculation
To inhibit pitch

d. Hardness
Affects sizing
Causes press pick-up
Makes pitch troubles

e. Turbidity and Insolubles
Makes dirt in product
Affects shower operation
Causes abrasion

f. Chlorides
Makes chemical reaction in product.

The objectionable substances and corresponding reasons reported are:—

a. Thirteen mills—Turbidity and organic matter—Dirt and discoloration
b. Four mills—Hardness—Pitch troubles
c. Three mills—Color—Reduces brightness
d. Two mills—Iron—Affects color
e. One mill—pH—Pitch troubles
f. One mill—Slime—Appearance, machine breaks

Three mills reported raw water satisfactory.

Twelve mills made no comment.

Specific treatment for removing objectionable constituents—

Six mills employed additional screening, or filtration through sand.

Two mills used alum flocculation then sedimentation.

Three mills sterilized water with chlorine, chloramines, Nalco, Merfenel, or Alchem.

One mill followed filtration with active carbon to remove final odor and color.

Twenty mills are doing nothing in this respect, or made no report.

Regarding the microbiological growths, considered as slime, the difficulties caused, and the resultant annual loss in money or its equivalent is shown ot be:—

Twenty-five (25) mills reported the trouble ranged from "yes," to "some" and "not much."

The troubles are: growths in lines, in chests, upon screens, dirt and slime spots in paper, breaks or paper machines too frequent wash-ups, slow-downs and lost time.

Eighteen (18) mills reported the paper quality was affected mostly by: slime-spots and holes, degraded appearance, increased dirt content, stains, and breaks.

The annual loss in dollars, (or equivalent) due to the biological growths is reported by nine mills as:—

a. $63,000.00
b. $20,000.00
c. $11,800.00
d. $2,000.00 to $3,000.00
e. 1500 short tons newsprint
f. 4 to 5% of operating time
g. small loss
h. Undetermined or none.

Efforts are made to control these biological growths by the following treatments:—

Seventeen (17) mills use chlorine or chloramines.

Nine (9) mills report use of chlorinated phenols.

Eight (8) mills using mercury compounds.

One (1) mill uses zinc hydrosulfite.

Eleven (11) are using chlorine in conjunction with one or more of the other compounds.

The control chemicals per ton of product as reported by the twenty-four (24) mills depends upon the toxicant used, with dosages varying from 0.2 ounce to 5.5 pounds per ton of paper.

A general summary of the quality of water for process use in the manufacture of papers containing groundwood is that mechanical treatment is adequate in most cases for cleanliness with the prevention or control of biological growths as the major concern.

New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

George Craig, Plant Engineer, Brown Company, Berlin, New Hampshire, a 1928 graduate of Lowell Institute.

Robert G. Hesselbart, In Charge of Industrial Resin and Adhesive Section, Plaskon Division, Libbey-Owens-Ford Glass Co., Toledo, Ohio, a 1938 graduate of Ohio State University with an M. S. degree.

George E. Shaad, Application Engineer, General Electric Company, Schenectady, New York, a 1935 graduate of the University of Kansas.

H. Scott Smith, Pulp Mill Superintendent, Central Paper Company, Muskegon, Michigan. He attended the University of Manitoba.

Luis R. Troncoso, Chemist, Cia. Industrial de Atenquique, S. A., Antenquique, Jalisco, Mexico, a 1944 graduate of Instituto Qimico Mendelejeff.

Flexibility of Microcrystalline Wax*

By Anthony Kinsel [1] and Hans Schindler[1]

Abstract

The details of a method for determining the flexibility of microcrystalline wax including the preparation of test samples is given.

The utilization of microcrystalline waxes which assumed considerable proportions during the war did not terminate at the end of that emergency period but, on the contrary, has been on the increase ever since. These waxes are quite different from the well-known paraffin wax both in physical and chemical structure and this is indicated not only by their higher molecular weight, viscosity in the molten state and melting point but also by the unusual properties which render them so useful. These include adhesion, ductility, and flexibility.

Flexibility at low temperatures, especially, is of great importance for coatings and waxed papers used in cold storage of foods since the ability of the coating to bend without breaking is essential to insure complete protection of the food regardless of repeated handling.

In spite of this importance and of the fact that flexibility is specified in many cases as a required property for microcrystalline waxes, no convenient test has been available to measure it and to obtain numerical results which permit comparison of different products and control of production.

This gap in the methods for evaluating of microcrystalline waxes has been filled by the development of a test for the flexibility of these waxes at a low temperature. As in many cases where the physical and chemical principles underlying a certain phenomenon are only incompletely known, it was considered best to use an empirical procedure which is simple and at the same time fairly close to the conditions to which the product is subjected in use. In accordance with this idea, the flexibility of microcrystalline wax is determined by bending a column of wax through a 90° angle and counting the number of bends required to break the column.

Apparatus

The specimens are prepared by means of the brass tube and plunger shown in Fig. 1A. The brass tube A of 1 inch I.D., is threaded internally to take plug B and an extrusion screw D having 14 threads per inch. The orifice in plug B has a diameter of 3/8 inch. In order to avoid the formation of a long air-hole caused by contraction of the wax, it is advantageous to screw

[1] Petrolia Laboratory, L. Sonneborn Sons, Inc., 88 Lexington Ave., New York, N. Y.

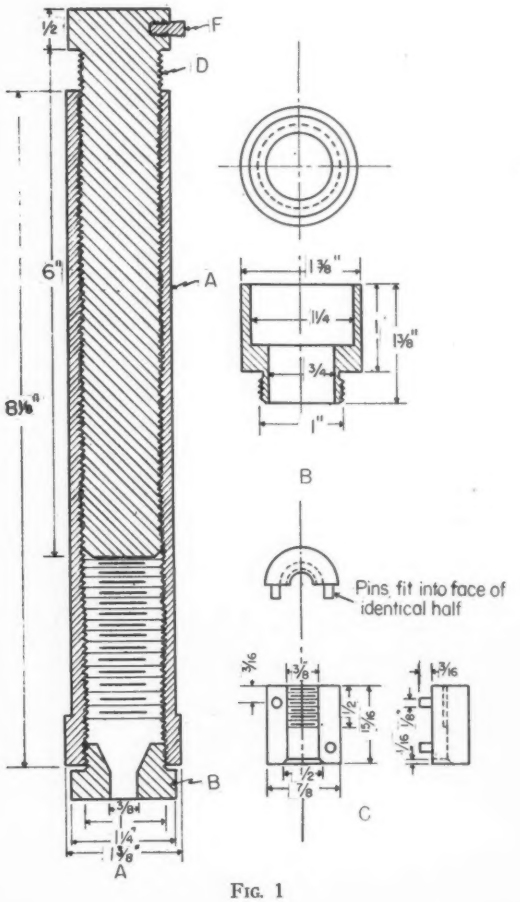

Fig. 1

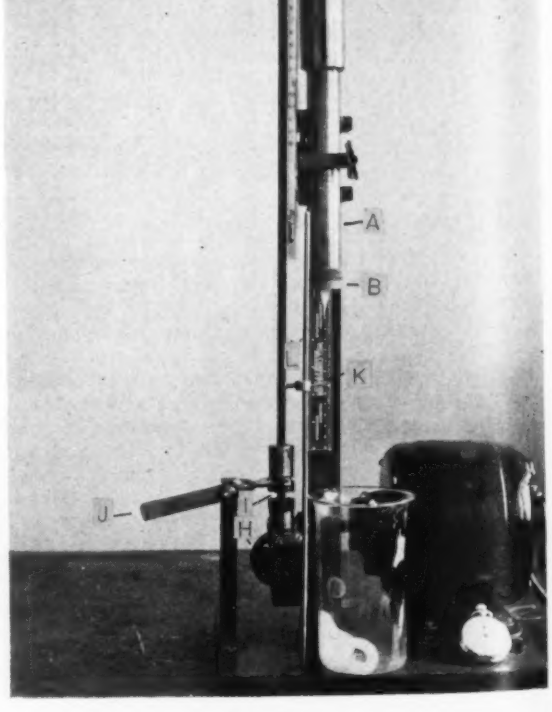

Fig. 2

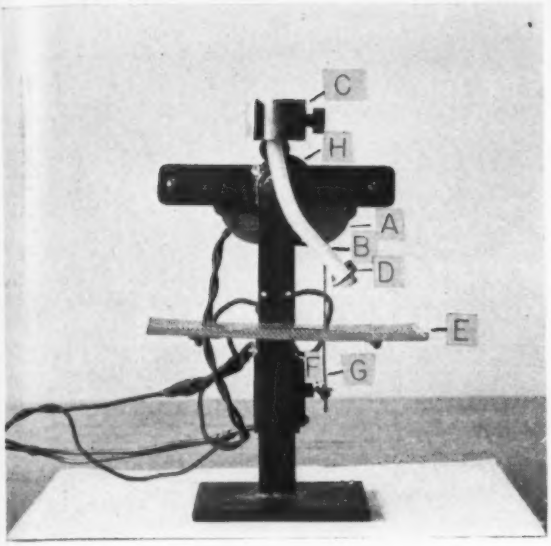

FIG. 3

a brass cup, about 1-inch high and 1¼ inch in diameter (Fig. 1B), into tube A. The wax is poured until both the tube and cup are full. This cup is removed after the wax has solidified.

EXTRUSION APPARATUS.

The extrusion apparatus shown in Fig. 2 consists of a slotted hollow cylinder G which can be turned by a ¼ h.p. electric motor through a series of gears H at a speed of 12 r.p.m. The driving mechanism can be engaged by hand lever J. The operation of the apparatus is as follows: Engaging the clutch I causes the driving mechanism to rotate the hollow, slotted cylinder G. Pin F transmits the rotation of the cylinder to the extrusion screw D which descends in the tube A and thereby extrudes wax contained in A through the orifice plug B. The extruded wax appears in the form of a ⅜ inch diameter cylinder, the length of which is indicated by a pointer K which slides on a graduated rod L mounted on the base of the apparatus support.

TABLE I.—REPRODUCIBILITY OF FLEXIBILITY TEST

Sample	Run No.	Individual Test Results	% Deviation from Average	Results Used for Computation of Flexibility	Flexibility at —20° F.
A	1	382	19.9	382	
		212	33.5	...	
		298	6.4	298	
		355	11.5	355	
		366	14.9	366	
		298	6.4	298	
	Average	318.5	Average	339.8	340
A	2	268	18.7	268	
		409	21.4	...	
		358	8.6	358	
		322	2.3	322	
		352	6.8	352	
		278	15.7	278	
	Average	329.7	Average	315.6	320
B	1	140	0.6	140	
		200	41.9	...	
		132	6.3	132	
		111	21.2	..	
		127	9.9	127	
		135	4.2	135	
	Average	140.9	Average	133.5	130
B	2	137	0.7	137	
		185	34.0	...	
		127	8.0	127	
		132	4.4	132	
		119	13.8	119	
		138	0.0	138	
	Average	138	Average	130.6	130

BENDING APPARATUS.

The bending apparatus which is shown in Figs. 3 and 4 consists of an electric windshield wiper motor A (E. A. Laboratories, Brooklyn, N. Y.) which moves brass rod B back and forth. The wax specimen is held by clamp holder C and fixed to B by ring D which is free to swivel about its connection to B. This clamp C is attached in such a position that the specimens move through an angle of 90°. The motor is automatically stopped when the column has broken since the broken column drops on tray E and by its weight displaces lever J and mercury switch K from their equilibrium position thereby shutting off the current. The number of strokes made by B until the column breaks is counted by an electric counter mounted outside the cold box in which the test is carried out (see Fig. 5). The counter is actuated by switch F which is moved by lever G. The latter receives its motion from rod B which is transmitted through eccentric H.

The motor is operated on line current transformed down. The speed of the motor is regulated by a rheostat controlling the output of the transformer.

CLAMPS.

The clamps consist of split brass cylinders, threaded in the upper half so that the wax is held securely. The clamps are bevelled at the bottom to prevent shearing. Figure 1C shows the details of their design.

AIR BATHS.

Two air baths are provided, one of which is maintained at 77°F and the other at the temperature required for extrusion of the specimens (see Procedure).

COLD BOX.

The cold box should be of sufficient size to permit storage of the specimens and accommodation of the Bending Apparatus. Refrigeration equipment and temperature control should be so designed as to maintain a temperature of —20 ±2°F. A suitable cold box is shown in Fig. 5.

Procedure

Heat the wax to be tested to 20°F. above its melting point. Pour the molten wax into a brass extrusion tube which is kept in an air bath set at 20°F. above the melting point and allow to remain at this temperature for 15 minutes. Remove the tube and let it stand at room

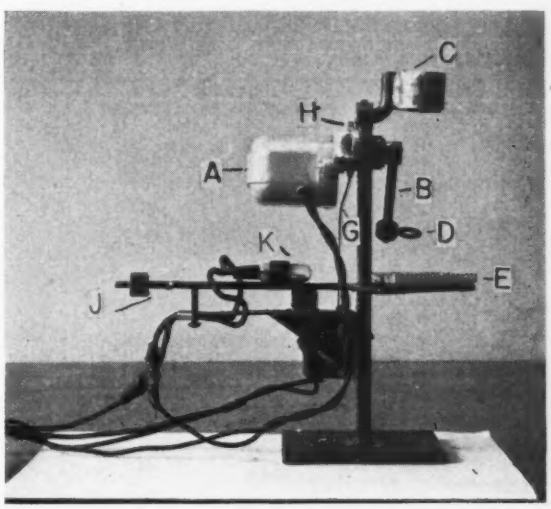

FIG. 4

FIG. 5

temperature until a temperature 50°F. below the wax melting point has been reached. Place the tube in an air bath maintained at 50°F. below the melting point of the wax and keep it at this temperature for 4 hours. Remove the tube from the air bath, attach the extrusion screw and extrude wax columns of 5-inch length. Make 6 or 7 columns from the contents of one tube. Keep the columns at 77°F. for 2 hours, then place them in the cold box at —20°F. for a minimum of 14 hours. Place the clamps in the cold box together with the wax specimens but do not attach them to the specimens.

At the end of the conditioning period, attach the clamps to the specimens (threaded part at the top of the wax column) so that the length of the column protruding from the clamp is 4 inches. Place the bending machine in the cold box, adjust the rod B so that ring D is directly below clamp holder C, place the column clamp in C and slip the end of the column through ring D. Secure the clamp by tightening the screw in C. Lubricate the ring D with a mixture of alcohol and glycerine if it sticks to the wax column.

Set the counter reading to zero and start bending the column by turning the rheostat knob until the motor starts moving. Adjust the windshield wiper motor speed by proper setting of the rheostat so as to obtain 20 counts per minute on the counter which corresponds to 40 bends per minute and maintain this speed during the entire run. Multiply by two the counter reading to obtain the flexibility (number of bends required to break the column). Test a minimum of 6 columns for each sample of wax.

Compute the flexibility by averaging the number of bends obtained for each specimen of the sample, eliminate the results deviating more than 20% from the average, obtain the average of the remaining values, and, after rounding it off to the nearest ten, report as flexibility.

The reproducibility of the test is satisfactory as indicated by the results of two runs on the same sample which are given in Table I.

TABLE II.—FLEXIBILITY OF MICROCRYSTALLINE WAXES

Sample	Flexibility at —20° F.	Penetration (ASTM D5-25)	Melting Point, °F. (ASTM D127-30)	N.P.A. Color
A	400	45	140.07	3½
B	380	39	156.7	3½
C	360	31	164.3	brown
D	310	34	155.7	1½
E	250	33	153.1	brown
F	250	27	162.0	brown
G	160	33	156.4	lighter than 1
H	100	21	155.7	4½
I	60	22	169.0	1
J	0	12	176.0	2½
K	0	7	189.0	lighter than 1

Experimental Work

The same degree of reproducibility as shown in the above table can be obtained in routine according to experience with the test for production control purposes for over a year.

Application of the flexibility test to various waxes is shown in the following table.

The data in Table II show clearly the difference in the low-temperature flexibility of various microcrystalline waxes. It can also be seen from the table that prediction of the flexibility from penetration or melting point alone is not possible although there is a trend towards higher flexibility with waxes of higher penetration. This is to be expected since these waxes contain more oil and this oil which is adsorbed on the surface of the large number of small crystals making up the wax acts as a plasticizer .

To summarize, it can be stated that the flexibility test described in this paper offers a convenient, reproducible method for determining one of the most important properties of microcrystalline, plastic waxes. Thus, it enables the manufacturer to select his raw materials and processes in such a way as to obtain a product of the desired characteristics and maintain its quality by testing for this property as in the case of viscosity, melting point, etc. At the same time, the test makes it possible for the consumer to select the product which according to a clearly defined specification fits his needs best.

Chemical Process Principles

Chemical Process Principles has been issued by John Wiley & Sons in three parts. The authors are O. A. Hougen and K. M. Watson, professors of chemical engineering, University of Wisconsin.

Part I deals with Materials and Energy Balances (45 pp. 5½ x 8½) and provides a comprehensive treatment of the applications of physical chemistry. Particular emphasis is given to some applications of thermophysics,, thermochemistry and the first law of thermodynamics. Among the subjects covered are stoichiometric principles, behavior of gases, vapor pressures, humidity and saturation, solubility and sorption, fuels and combustion, chemical processes (Price $5.00, in Canada $6.00).

Part II deals with thermodynamics (412 pp. 5½ x 8½). The subjects covered are thermodynamic principles, properties of fluids, expansion and compression of fluids, thermodynamics of solution, physical and chemical equilibria, thermodynamic properties from molecular structure. (Price $5.00, in Canada $6.00).

Part III deals with Kinetics and Catalysis. (348 pp. 5½ x 8½) and covers homogenious reactions, catalytic reactions, mass and heat transfer in catalyst beds, catalytic reactor design, heterogenious reactions (Price $4.50, in Canada $5.40).

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y.